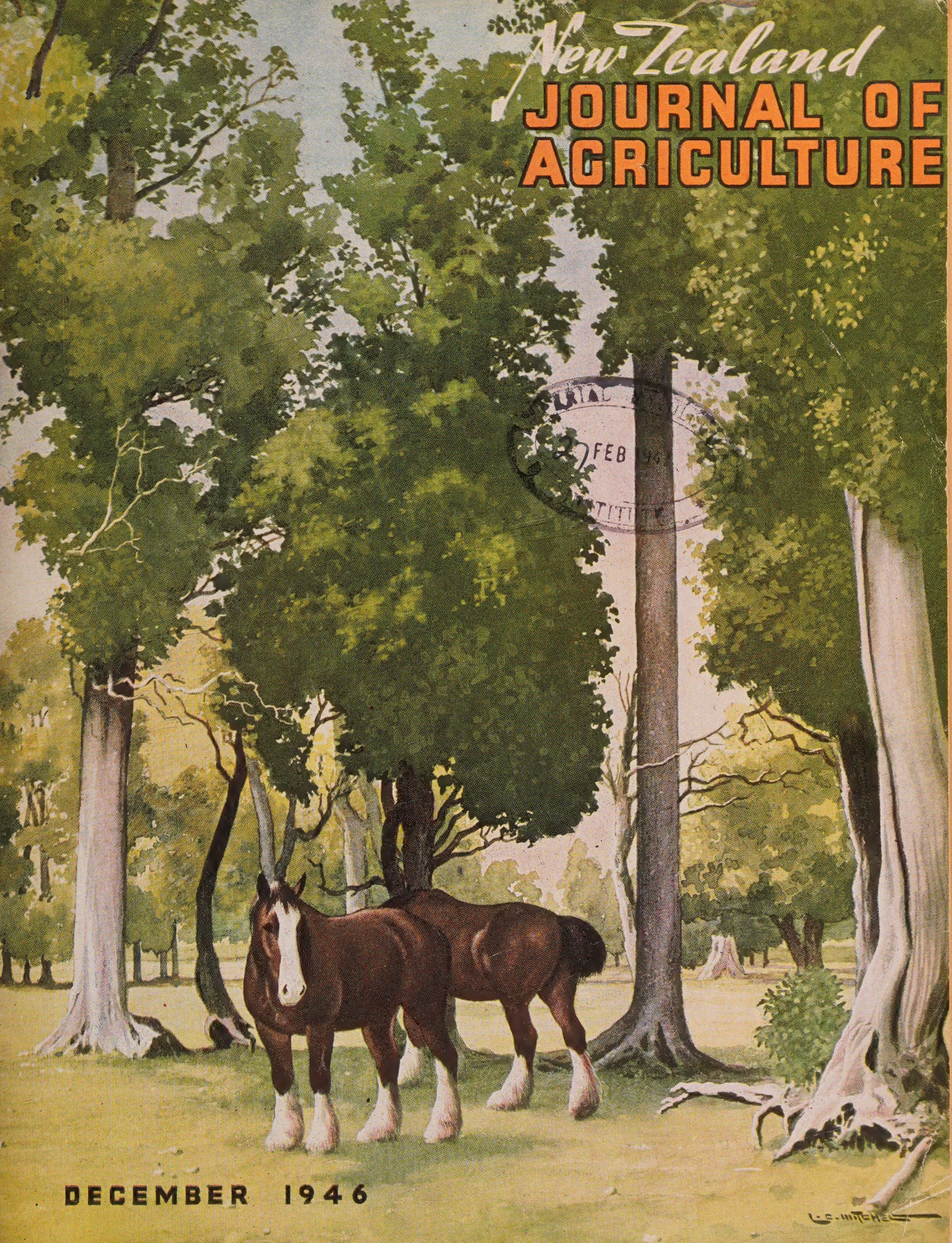
New Zealand JOURNAL OF AGRICULTURE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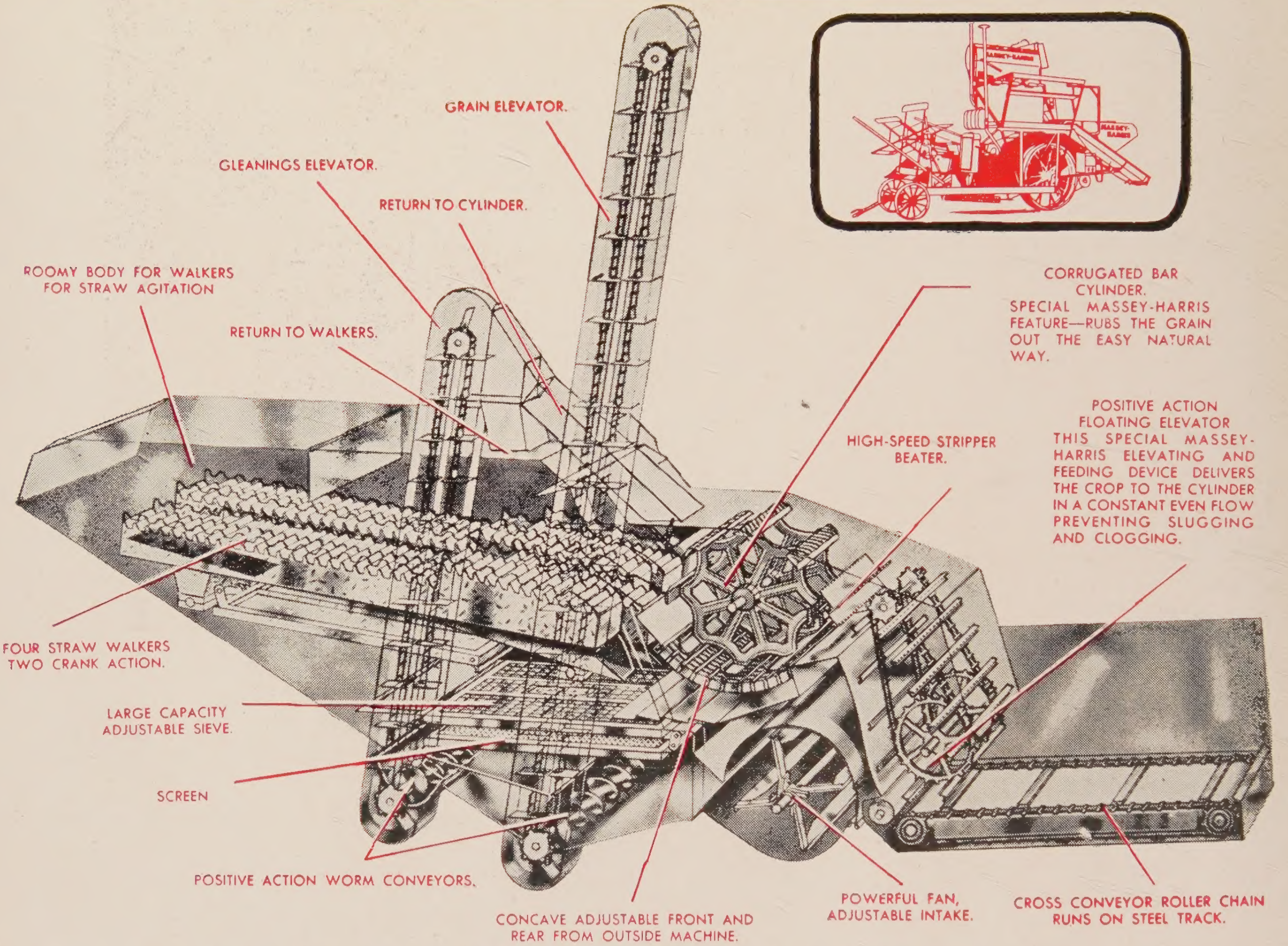
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New Zealand
JOURNAL of
AGRICULTURE

Rejection of Pigs by Works

WHAT KILLING SHEETS TELL

By W. D. ROSS, M.R.C.V.S., *Veterinarian, Palmerston North.*

FAR too many pigs sent to freezing works and bacon factories are defective to the extent that they have to be trimmed up, rejected, have pieces cut off, or be wholly condemned. Despite all trimming and treatment, a percentage fails to reach the required export standards and must be rejected or condemned. This repetition of an old familiar story is justifiable as, despite the great progress made by the pig farmer in the past seven years, rejections and condemnations are still a heavy drain on New Zealand pig meats. The waste of good feed and hard work in breeding and feeding pigs to be rejected or condemned is a luxury neither this country nor Britain can afford.

WHEN the killing sheets return from the works the pig farmer is confronted with a series of abbreviations at the bottom of the sheet; these indicate exactly why pigs were rejected or condemned and the weight of what was left of partially-condemned pigs. If the cheque accompanying the sheet is smaller than was counted on, he can rest assured that there has **not** been a mix-up. Freezing companies and bacon factories have evolved fool-proof systems of identifying every client's line, apart from which the farmer's loss is also theirs, as they have less to export and more labour to expend on salvaging what is left.

Closer study of the sheet will show why the cheque is not up to standard. The same abbreviations are used by nearly all firms and pig-marketing associations; some are self-explanatory or are explained, but if the meaning is not clear, the companies will be glad to elucidate. The farmer's good will is the life of their business and a satisfied client is a good form of advertising. So the farmer should not be afraid to ask questions if he is in doubt.

Where possible the pig breeder should go into the works and see his own pigs inspected and graded. Finding time for that may be difficult, but he has spent months looking after the pigs and a few more minutes spent in this way may save a lot of time in the future.

The meat inspector, whose job is not simply to reject or condemn but the much more difficult and skilled task of knowing what can be salvaged safely, will explain reasons for rejection, condemnation, and grading. To read about tuberculosis or pleurisy is no doubt interesting, but to see one's own pigs affected is really impressive.

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but ...he can always learn something from the other fellow.

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TABLE OF CONTENTS—DECEMBER, 1946.

Rejection of Pigs by Works—W. D. Ross 497
Extension of Seed Wheat Certification—J. H. Claridge .. 507
Propagation of Small Fruits—J. P. Hudson 509
Conserving Soil Moisture in the Orchard—J. E. Hume .. 510
Paspalum—P. S. Syme 511
Preparations for Greenfeed Crops in South Island—E. B. Glanville 514
Coccidiosis of Poultry—W. G. Fischel 515
The Potato Tuber Moth—E. B. Glanville 517
Studies in Farm Management: A Poverty Bay Hill-country Farm—V. P. Boot 519
Home Garden Notes—D. K. Pritchard 529
Methods of Stacking Baled Hay—K. A. Swindells 533
Preparing Land for Autumn-sown Pasture—E. B. Glanville .. 536
Farming in New Zealand: Subsistence Farming—P. W. Smallfield 537
Second Growth Control in South Otago—J. G. Richards .. 549
Methods Used in Removing Surplus Honey from Hives—L. H. Johnson 554
Farm Work for January 557
Winter Feeding of Hoggets in Canterbury—T. K. Ewer .. 559
Harvesting of Cereal Crops—G. A. Blake 561
Radio Broadcasts 561
An Efficient Bale Elevator—G. L. Banfield 562
Research into Problems of Machine Milking—W. G. Whittleston 565
Wastage in Silage—P. S. Syme 566
Sweet Clover—T. A. Sellwood 567
Harvesting, Packing, and Marketing Stone Fruit—S. Frew .. 571
Manuring of Wheat with Phosphates—P. B. Lynch 573
Show Dates 577
Mechanical Boxthorn Hedge Cutter—J. E. Davies 579
Direct Heading of Subterranean Clover—D. R. Wilkie .. 582
Control of Grass Around Beehives—C. R. Paterson 584
"The Good Neighbour," by Mary 585
First Aid in the Home—C. Meachen 586
Marmalade—Eva Topping 587
Backgrounds: Wall and Floor Coverings—Norma K. Metson .. 591
The Flower Garden in January—J. P. Hudson 601

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For the benefit of those who are too far away from a works or bacon factory to follow their own pigs through, or to attend one of the popular pig field days at the works, here are some of the abbreviations likely to appear on a killing sheet and notes on causes and parts condemned. For advice on avoiding or curing these conditions the farmer should not hesitate to consult his local Departmental veterinarian or stock inspector.

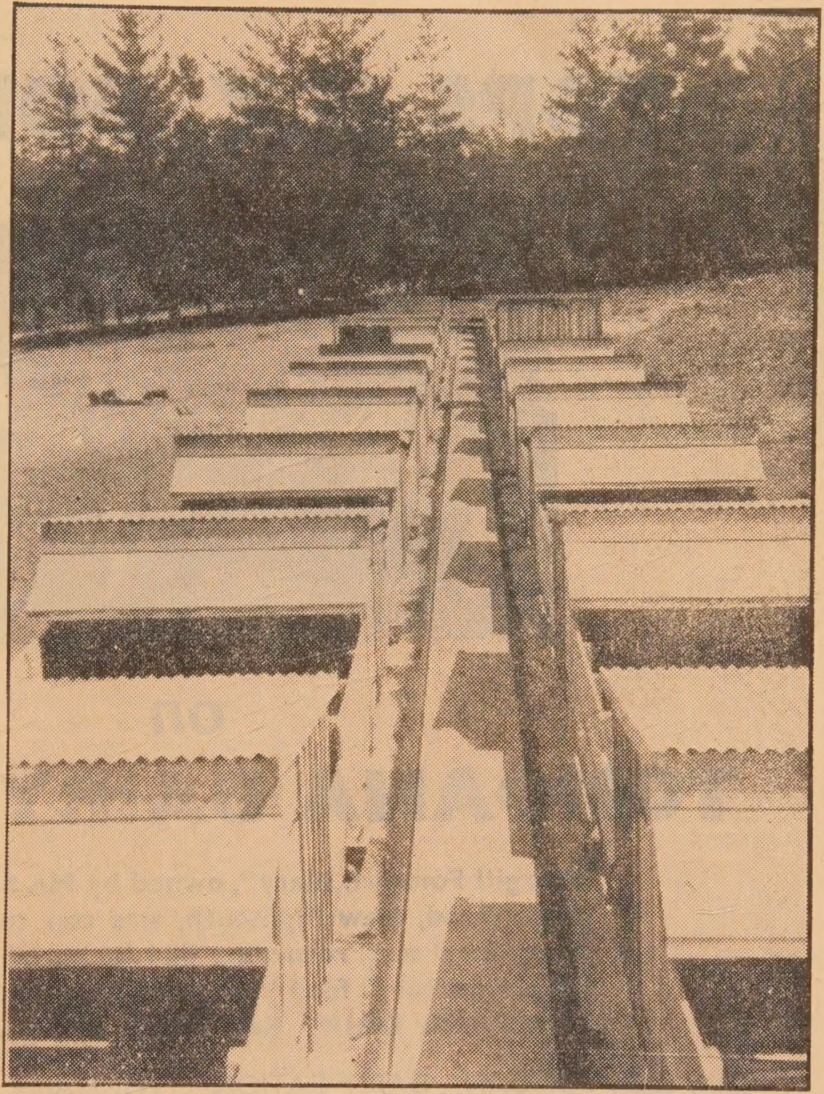
T. or T.B.—Tuberculosis

Tuberculosis is a chronic contagious disease, characterised by progressive emaciation. The symptoms, however, are as varied as the sites in which the lesions of the disease are found. Most pigs show no evidence of the disease during life, as they are killed before the emaciation stage is reached. In fact, at times T.B. seems to stimulate growth and wellbeing, as some of the fattest young pigs are seriously affected with the disease in its widespread or generalised form.

It is difficult to spot T.B. during life in pigs, but in some cases the glands under the jaw or ear are swollen enough to impede movement of the head. The glands may rupture externally and discharge thick, cheesy pus. Lung affection is usually indicated by a short, suppressed cough, later becoming more frequent, with retching and distressed breathing.

Abdominal affection may be indicated by a loose hanging tail, an arched back, and the pig lying or crouching in a corner on his own and resisting movement. However, few pigs live long enough to show definite symptoms and those they do show can be confused with half a dozen other troubles.

Boars and sows should be watched carefully for symptoms such as coughing, wasting, swollen glands, and abscesses on the udder, as they may easily spread infection to the herd.



This Lange and Taumbor lay-out provides ideal farrowing quarters.

Fourteen per cent. of all pigs killed in New Zealand are affected with tuberculosis; 1.5 per cent. are so seriously affected that they have to be wholly condemned for generalised T.B., and 12.5 per cent. are partly condemned. The majority of these are headless pigs—those with the gland below the jaw (the submaxillary) affected. The affection may be a yellowish spot about the size of a pin's head, or the whole gland may be swollen to the size of a potato. These headless pigs are exportable subject to a vigorous check inspection of every accessible gland or organ.

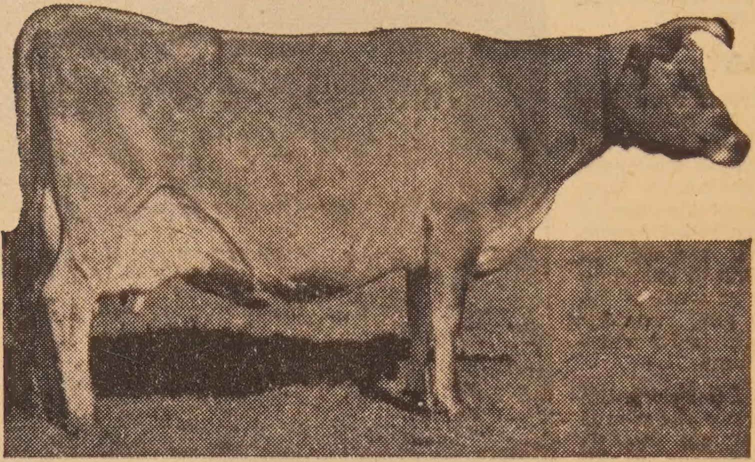
Generally 99 per cent. of affected pigs have head and throat lesions, the bowels are affected in 37 per cent. of cases, liver 31 per cent., stomach 17 per cent., spleen 16 per cent., kidney 1 per cent., and backbone .7 per cent. or lower. Every pig is judged on its merits, all organs being examined; by a system of tags and pins the final inspector can weigh up all the evidence. On reaching Britain these carcasses are subjected to a percentage examination as rigorous as in New Zealand, and it says a great deal for Dominion methods that few, if any, carcasses are condemned in Britain. The usual practice of freezing companies is to deduct 10 per cent. of the carcass weight for a condemned head and pay for this weight, say 10 to 20lb., at a reduced rate.

The commonest source of infection with tuberculosis is raw skim-milk from tuberculous cows, but pastures contaminated by T.B. cows or their discharges, and old, muddy, infected pens may be responsible. Tuberculous sows may be the cause of whole litters not reaching more than baconer weight. In manure on pastures the tubercle bacillus may live about 8 months, but sunlight destroys it in a few hours; hence the need to keep pig pens and their surroundings as clean as possible. Dirt and mud afford excellent protection from sunlight for not only the tubercle bacillus but dozens of other bacteria and organisms harmful to pigs.

P. or Pl.—Pleurisy

Pleurisy is an inflammation of the smooth, glistening covering of the lungs, and chest wall, and is usually

TOPS N.Z. FOR 1946



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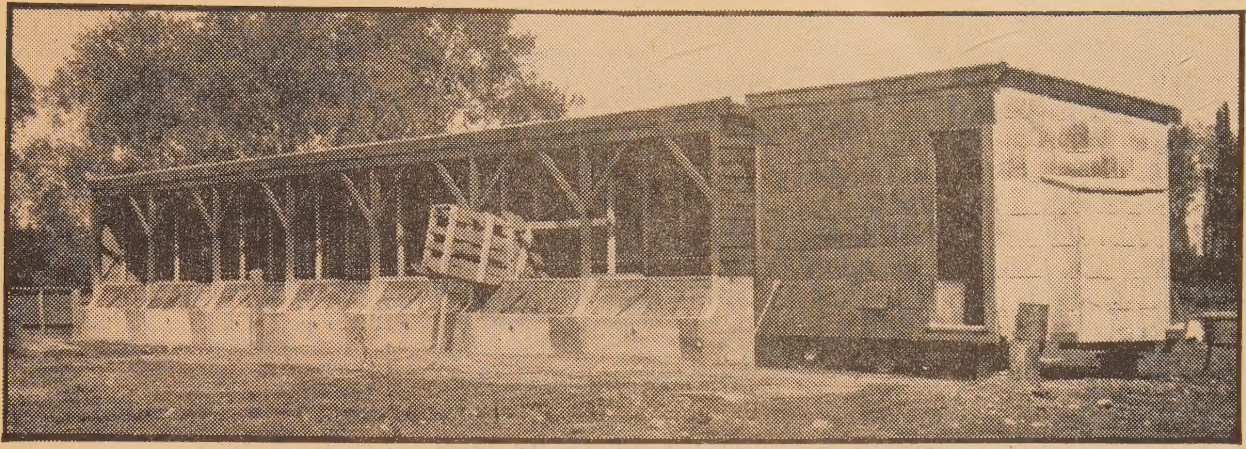


Mr. De Renzy's fattening house at Winchester, Canterbury. The cost of providing conditions like this is more than offset by the absence of disease and saving of feed.

associated with pneumonia. Fourteen per cent. of all pigs reaching the works have, at one time during their lives, suffered from pleurisy to such an extent that they have to be trimmed to be suitable for export; despite all careful trimming 1 per cent. have to be rejected.

Acute or active pleurisy, in which the animal is fevered, brings complete condemnation. Any fevered carcass, if passed for human consumption, might give rise to food poisoning. In the majority of cases, however, the pleura is thickened and the lungs adhere to the chest wall, indicating that the pig has had an attack and has recovered. These adhesions are carefully trimmed up, wiped, and, if possible, removed. If, however, the pleura has to be "stripped" or is damaged or thickened, the forequarter must be rejected. If pus is present the carcass is condemned as a protection from food poisoning.

Reject price is only part of the loss, as any pig which has had a setback in its growth because of pleurisy is miserable and coughing for some time and requires more food to bring it to market weight than litter mates which escaped infection.

The high incidence of pleurisy is caused by the pig's vitality being lowered and consequent invasion by the *Pasteurella* organism. This is a common bacteria of the healthy pig's lung, but when resistance is lowered it makes good its opportunity and seizes all the space it can, growing out of all proportion to its normal numbers. The same thing happens to humans when they have coughs and colds.

Unbalanced rations, poor or dirty housing, and muddy, ill-drained runs with no shelter from rain, wind, or sun all lower resistance and invite high losses from unthrifty pigs, pneumonia, and pleurisy.

Pe., Pr., or Per.—Peritonitis

Peritonitis is inflammation of the peritoneum or smooth, glistening membrane surrounding and enclosing all the organs and walls of the abdominal cavity. Thickening and adhesions are again present and the membrane, with all the fat immediately under it, has to be stripped out.

Infection from faulty castration, travelling back up the stump of the cord, the covering of which is a continuation of the peritoneum, seems to be one of the major causes of peritonitis. Internal parasites migrating through the walls of the intestine and boring into the liver and kidney carry putrefactive and pus-forming bacteria from the intestines which may give rise to peritonitis of varying severity, depending on the mass of infection and the health of the pig.

Lowered resistance, which leads to pleurisy caused by *Pasteurella* organisms, can also cause the suipestifer bacteria, found in the intestines of healthy pigs, to grow out of bounds, which results in enteritis or inflammation of the intestine, with scouring and loss of condition, or death. Again the resulting peritonitis is not the greatest loss; it is the number of pigs that remain unthrifty, if they live, and use extra feed and time to reach baconer or porker weight.

Unbalanced rations, parasites, faulty castration, contaminated surroundings, bought-in pigs carrying suipestifer and contaminating the troughs, water supply, and runs, all help to upset the delicate balance between health and lowered resistance.

A. or Ab.—Abscess

An abscess is a closed cavity containing pus, which may be found in any part of the carcass. The whole pig may have to be condemned or rejected, according to the situation and degree of infection. If the carcass becomes contaminated with pus while being dressed it must be condemned, as the risk of food poisoning from pus-producing bacteria is very high. Some of the worst outbreaks in the history of food poisoning have been caused by pus-contaminated meat or meat products.

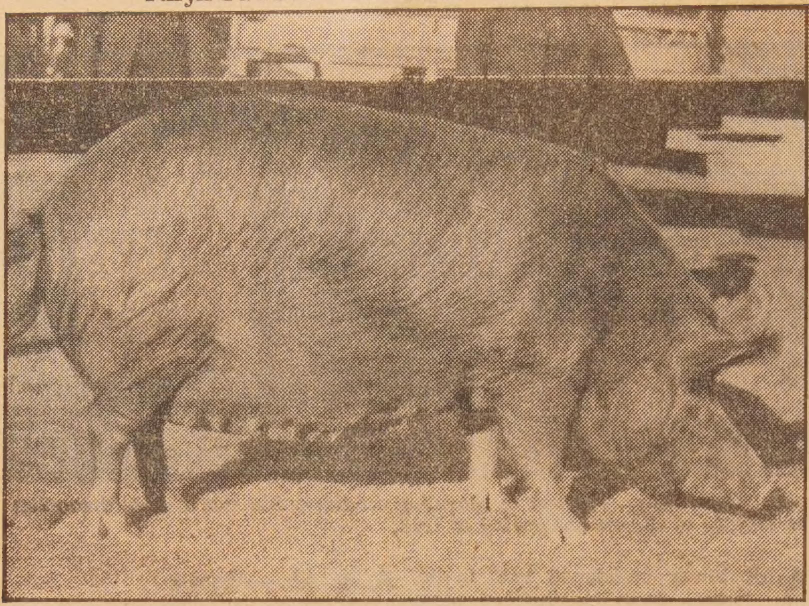
Dirt is again a likely source of infection—lice, staggy pigs, barbed wire, protruding nails, broken glass, loose sheets of iron, or old farm machinery.

Any infected and neglected cut or tear, however small, can give rise to an abscess if not treated. Keep a supply of a good disinfectant on hand, open up all abscesses, and allow them to drain and heal. More important, of course, is to avoid the causes of cuts, scratches, or irritation. Keep the pigs free from lice; clear the pens and runs of dangerous sharp obstructions, and do not use the pig runs as a junk yard for worn-out trucks, discarded discs, or old wire and iron.

Ar. or Arth.—Arthritis

Arthritis is inflammation of a joint, which is usually full of discoloured synovia (joint-oil) and swollen. More hams are condemned or partly condemned for this condition than for anything else. Occasionally the pig is in poor condition, with the joints of all four legs affected; then it is wholly condemned, the condition being called polyarthritis.

Dirty navel cords in young pigs often lead to infection of the joints,



Good breeding stock, such as this Tamworth sow, is an essential foundation for the production of healthy litters.

which swell and may become septic and burst. A safe plan is to clean the cords with iodine if conditions are muddy or if this trouble has occurred on the farm with previous litters.

The organism *Erysipelothrix rhusiopathiae*, the causal organism of swine erysipelas, fortunately, for some as yet unknown reason, does not give rise in New Zealand to many outbreaks of the acute type, with diamond-shaped red or purple patches on the skin, fever, lameness, heart trouble, or death; but it does cause much arthritis. These cases present swollen and inflamed joints, some of which may clear up but a great many of which remain to cause condemnation of the affected leg or carcass in the works.

Well-fed, well-housed pigs with good runs can recover quite well from an attack and it does not seem to worry them unduly, but the pig with low powers of resistance falls an easy victim and becomes permanently crippled.

The *Erysipelothrix rhusiopathiae* can live and multiply in a warm or temperate climate and in muddy, wet yards, and is very hard to eliminate. In fact, if the soil is contaminated badly, the best plan is to shift the pig yards, as the organism can build up to the stage of causing serious epidemics with severe losses. Britain and America, with old-established pig pens and pig lots, have to use vaccines and serums against swine erysipelas as a regular part of pig-rearing; New Zealand should profit by their experience and take no unnecessary risks with this organism.

Bruising, spraining, mineral and vitamin deficiencies, and rickets may also cause swollen joints.

F.C.—Faulty Castration

A swelling at the site of the operation on the ends of the spermatic cords is usually evidence of faulty castration. Some pigs have large swellings which may discharge pus. The infection can spread to the abdominal cavity and give rise to varying degrees of peritonitis, or the scar tissue may be the only seat of abscess formation.

The swollen spermatic cords must be cut out, thus spoiling the hams for freezing, apart from the fact that when conditions return to normal Britain will not accept hams that are badly cut into. If abscess formation is present, the carcass may have to be condemned or partly condemned, according to the severity and spread through the body.

Castrate pigs when they are 3 or 4 weeks old, and try to select good weather and dry surroundings so that mud or dirty rainwater draining down the pig's back does not enter the wounds. Pigs castrated when about a month old are not badly set back.

The site of the incision should be washed with antiseptic and soap, instruments should be clean and kept clean, and the incision made low so that no pocket is left and drainage is free, as pockets provide an ideal site for bacteria to grow and multiply, and give rise to abscesses, peritonitis, or schirrous cord. The incision should be about 1 to 1½in. long. Do not use harsh corrosive antiseptics, as they do more harm than good. There are plenty of mild but efficient antiseptics for this job and they are worth a little extra in cost; acriflavine is as good as any.

Sell as light porkers all pigs with retained testicle or testicles. The reason for this is given in the following paragraph.

S.O.—Sexual Odour

Under the heading "sexual odour" are listed pigs from which only one testicle has been removed and those with both testicles retained in the abdominal cavity, thus leaving the pig with all the characteristics of the boar. If the pig is not killed at the light porker stage, the odour of the boar condemns the pig when it comes to the baconer class. No matter how bacon from a "rig" pig is treated, boiling or frying will always bring out the odour.

Again feed is wasted, and a rig pig causes a lot of damage in a truck of pigs by bites and bruises. At the light porker stage the odour is not strong enough to condemn the carcass and the rig has not fully developed his fighting propensities.

Cull boars, if castrated, fattened, and sent in as choppers, should be allowed at least two months from the time of the operation for the odour to be eliminated; otherwise they are likely to be condemned. Cull boars, treated properly, provide a useful source of sausage meat, which is in short supply at present.

S.D. or D.—Skin Disease

Any disease or skin defect which damages the skin is listed as "skin disease." As the meat of the pig is sold with the skin on, the pelt mus be clean and free from blemish. However good the body type, the eye of meat, the back fat, and other factors may be, any skin defect, especially in porkers, necessitates the skinning of the affected area and the automatic rejection or degrading of the carcass from exportable to sausage or smallgoods meat—a serious drop in value. Baconers after being singed and scraped can be peeled to a minor degree and small blemishes camouflaged away.

Mange (rarely), lice, sunburn, and urticaria or food rashes are the chief offenders.

Mange is a notifiable disease under the Stock Act, and the local veterinarian or stock inspector should be notified if it is suspected. Intense irritation, pigs losing condition as they constantly rub and scratch and have no peace, and crusts or scabs behind the ears and shoulders are all symptoms of mange. The parasite cannot be seen with the naked eye; skin scrapings must be examined under a microscope to confirm suspicion. However, this disease is rare and mild infestations will respond to the treatment advised for lice.

Four or five inches of waste motor oil floating on the surface of a dip or applied by hand every 10 days will soon destroy lice. A sack soaked in motor oil and tied around a post which is accessible to the pigs provides scratch and cure in one.

Sunburn is serious in white-skinned pigs if no shelter is provided in midsummer. The skin cracks, scabs form, and if subjected to frequent attacks, the skin becomes horny and warty. Dressing with waste engine oil and lampblack will help considerably, but shelter is the main essential. A mud-wallow may protect the pig from the sun, but infection picked up in old wallows may cause abscesses or, worse still, *Spirochaetal necrosis*, which will be described under "wounds."

Urticaria resembles a nettle rash in which the tender parts of the skin, belly, behind the ears, and crutch are reddened and inflamed. In the main this is caused by digestive upsets and unsuitable rations.

Constipation or scouring must be watched for as early indications of faulty diet. A few doses of Epsom-salt or liquid paraffin may relieve the constipation, but the diet should be changed as well and a run-off on pasture allowed. If scouring is present, check up on the troughs to see that they are clean and sweet. Dose the pigs with castor oil, reduce the feed for a day or two, and provide access to good, clean grass.

Decayed town garbage must be eliminated and dirty skim or whey pipes cleaned out or renewed. Sudden changes of feed may precipitate digestive upsets.

N. or Neph.—Nephritis

Nephritis is inflammation of the kidney. If it is active and the pig fevered, the carcass is condemned. Usually the kidneys are pitted or scarred by a previous attack or by the migrations of internal parasites. The kidneys are removed and condemned, and if pus is present, the whole carcass must be condemned. Food poisoning has been traced to the consumption of meat from an animal with a kidney abscess.

Suipestifer is the common organism found. Parasites in young porkers leave their mark on the kidneys. Feeding and housing must be attended to; foul skim pipes, decayed town offal, and draughty, dirty quarters must all be eliminated.

The kidneys of pigs form a valuable export, but only about 60 per cent. are exportable, the rest being condemned with the carcass in cases of T.B., etc., removed for nephritis scars, or so affected with hydatids that they must be condemned; 640,000 New Zealand pig kidneys were condemned last year. With each kidney weighing about 4oz., 160,000lb. of kidney was lost.

W.—Wounds

Scar tissue may cause rejection of part of a carcass because of unsightly puckering and contraction of the skin in healing. Septic wounds condemn part or whole of a carcass, depending on the site and severity. Abscess formation, dealt with under that heading, may be present.

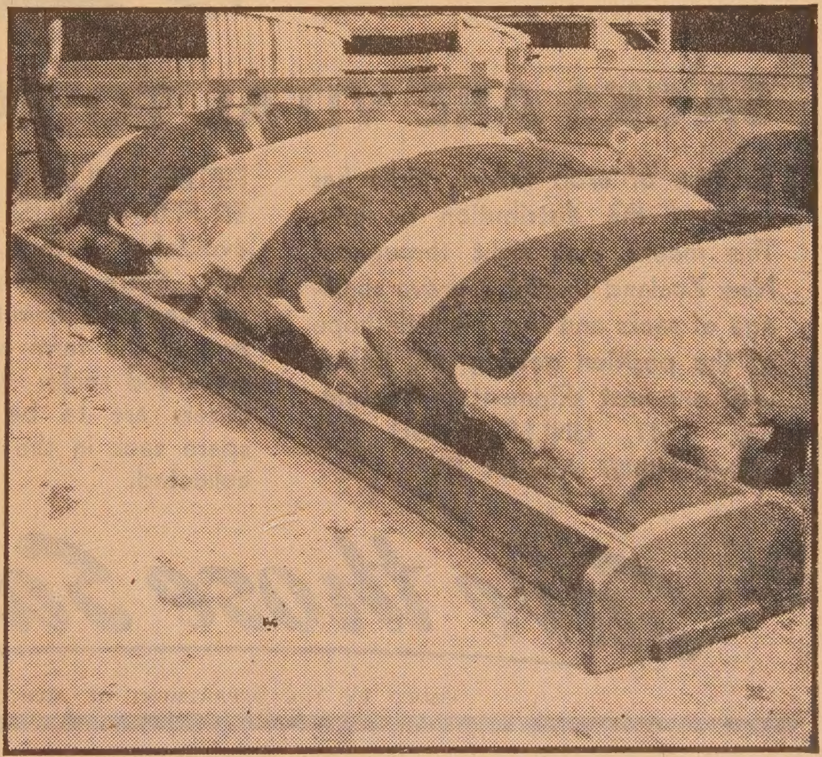
Scratches may become infected with *Spirochaetes*, organisms found in wet, muddy pens and runs. These organisms cause ulcerating skin lesions of varying size and severity, according to the length of time they have been neglected. The ulcer, called *Spirochaetal necrosis*, spreads out like ringworm, causing a black slimy mess raised slightly at its borders and oozing evil-smelling pus. Pigs arrive at the works with these skin sores up to 12in. in diameter. If such sores are thoroughly cleaned with warm soap and water and dusted with tartar emetic at weekly intervals, they will clean up satisfactorily. Be very careful using tartar emetic, as it is very poisonous and must not be allowed to contaminate water or feed.

Pointed objects, staggy pigs, dog bites, etc., are the causes of cuts, which become infected from dirty yards. Dress all cuts and scratches and watch out for ulcers. Above all, eliminate the causes of scratches and wounds before trouble starts.

B.—Bruises

Bruises, if at all extensive, must be thoroughly trimmed out and explored. A small skin blemish may lead to a pocket of congealed blood and torn muscles the size of a saucer. This, of course, disfigures the carcass and condemns the part. Bruising may be severe enough to justify condemning the whole carcass if the animal is fevered and in a bad toxic condition.

The cause is obviously rough handling in trucking—kicking and hitting with the handiest piece of wood about the place. A piece of wet canvas about 3ft. long and a foot wide, folded up to about 3in. wide, will act as a good coaxer; it makes lots of noise, scares the pig along, and does little damage. Overcrowding in narrow loading races or pens leads to pigs going down and being severely bruised by other pigs scrambling over them.



Cleanliness encourages pigs to eat, which means the full use of, and therefore a saving of, food, and promotion of growth.

What's behind your door?

SACKS ARE VITAL TO FARMING

Because of crop failure, India has rationed the distribution of jute. This means that right throughout New Zealand there's a grave shortage of sacks and there is little hope of the position getting any better until our next shipment in September, 1947, UNLESS YOU DO SOMETHING ABOUT IT.

FIFTEEN MILLION BAGS ARE NEEDED FOR FERTILISER AND LIME. The avoidable wastage of sacks is enormous. Store sacks in a dry place until you can send them to your dealer. Look around the farm and root out those discarded sacks. If this season's fertilisers are to be distributed every spare sack in the Dominion must be collected.

Save those Sacks

ISSUED BY THE DEPARTMENT OF AGRICULTURE.

If pigs are handled well at the farm end, and returns still come back showing bruising, check up and see that old choppers or stags were not loaded in with the baconers or porkers. The freezing companies and bacon factories will be glad to help prevent bruising; it is to their advantage, too. The carrier may not know how to handle pigs or may be in a hurry, but they are the farmer's pigs and it is his cheque that is affected.

Py.—Pyaemia

The term pyaemia is applied when pus-producing organisms invade the bloodstream from some suppurating focus and are carried all over the body, giving rise to multiple abscesses in the muscles, kidneys, liver, lung, and brain. All carcasses affected must be condemned.

Septic wounds, abscesses, parasites, faulty castration, septic pleurisy, and such substances as broken glass in the food all help to put pus-producing bacteria into the bloodstream, emphasing the need to dress all cuts with antiseptic, castrate cleanly, and prevent parasites, pleurisy, and peritonitis. Watch for dangerous foreign matter in the feed, particularly in hotel or restaurant garbage.

M.—Melanosis

Melanin, a dark brown pigment normally present in hair, skin, eyes, hooves, etc., may at times be secreted in excess by the body and be deposited in patches in the subcutaneous fat of the belly (seedy cut), or it may invade the bloodstream and multiply in the form of tumours in any part of the body Some breeds of pigs are more prone to melanosis than others and it may be a dominant feature in the line being bred. Seedy cut lowers the value of the bacon affected, and if it is very bad, the parts may have to be trimmed off. When it is spread over the body in tumour form the carcass is condemned.

Emac. or E.—Emaciation

A pig in very poor condition with no fat on it and even the muscles wasted is described as emaciated. Natural thinness or leanness because of lack of sufficient nourishment must not be confused with emaciation, the usual cause of which is some form of chronic disease. Thin carcasses are passed, but emaciated pigs are condemned.

W. or M.—Wet or Milky

Cull sows sent into the works as choppers when still in milk have the mammary glands removed and are rejected. The cure is obviously to dry them off before sending them to the works. They will be in better condition and a better economic proposition.

Def.—Deformities

Congenital deformities such as curvature of the spine and rickets come under the heading of deformities. These carcasses are rejected. Only the bones are misshapen, and the meat is perfectly fit for food if the pig is in good condition otherwise. Congenital deformities cannot be foreseen or cured, but the pig should be eliminated as soon as it is noticed.

Rickets is a nutritional disease of young pigs characterised by poor bone formation, twisted limbs, swollen joints, knobby ribs, curved spine, and poor teeth. Vitamin D provided in green food, full milk, and cod-liver oil, in conjunction with sunlight and bone meal or bone flour, will prevent young pigs becoming rickety.

Rickety pigs are likely to fall victims of all the diseases pigs can have and are not necessarily all "bad doers." Some quite good-looking pigs may be coarse in the joints, showing that they have a touch of rickets caused by unbalanced diet or lack of sun, especially if they are housed or being topped up. Cod-liver oil is invaluable in such cases in winter and spring if the pigs must be housed, but two hours' sunshine daily in a good paddock is a good cheap preventive.

Hydatids

Hydatids is the cystic or intermediate stage of the *Taenia echinococcus*, a tapeworm of the dog. A pig can contract hydatids only by eating food or drinking water containing the eggs of the tapeworm, which lives in the dog and forms its eggs in the dog's intestine. When ripe the eggs pass out in the dog's faeces and are ready to give hydatids to animals or humans. A dog can get the tapeworm only by eating raw meat or offals containing hydatid cysts. In the cysts are dozens of small tapeworm heads, which fasten on to the inside of the dog's intestine, where they develop into adult form to lay more eggs, to infect more sheep with hydatids, to infect more dogs, and so on.

The tapeworm in the dog is only about 1-3in long fully grown, so the farmer can never be sure that a dog is not infested, dogs must be dosed regularly.

About 80 per cent. of pigs are affected by hydatids and only 50 per cent. of pig livers are exportable because the others are so badly affected with cysts that they have to be condemned. This is the penalty the country must pay because 80 per cent. of farmers do not use the arecoline tablets they pay for when registering their dogs. It is a simple story, but no more simple than some of the other easy ways of losing money on pigs.

Large Round Worms

Another parasite which should be mentioned is *Ascaris lumbricoides*, the large round worm of the pig. It is about as thick as a pencil and up to 10in. long. These round worms cause a lot of trouble, especially in young pigs. The adult female worm lays eggs in the intestine of the pig; they fall on the ground and develop into a form which will infect another pig which picks them up in food or water. They then bore from the intestine to the liver, causing peritonitis and liver damage; from there they are carried in the bloodstream to the lung, where they develop to the next stage, causing coughing, retching, and even pneumonia. Later they are coughed up and swallowed to develop into adults in the intestine, where the female lays up to 200,000 eggs daily to contaminate runs and pastures and infect others. Young pigs suffer most and may die if badly infected. The unborn pig may become infected from the sow's blood; hence the need to treat sows for worms before farrowing.

Infection may be so severe that the intestines are blocked with masses of worms coiled up like a ball of string. Even the bile ducts may be closed by worms, giving rise to jaundice.

On muddy, damp pastures the parasite can remain infective for years, but dry runs with plenty of sunshine will soon clean up the *Ascaris* if dosing is carried out regularly. Pigs can be dosed with phenothiazine, oil of chenopodium in castor oil, or tetrachlorethylene, but it is as well to discuss the question with the local office of the Department of Agriculture or Swine Husbandry Instructor before starting a dosing programme. In the meantime beware of buying in infected pigs.

Summary

Now is the time to look to those simple things which cause rejection of pigs and do something about them before the season gets under way. Insurance schemes and Government compensation for condemned stock are only crutches for the incompetent; but, unfortunately, losses creep up on even the best farmers if simple precautions are neglected. The advice of officers of the Livestock Division is freely available on all aspects of pig feeding and disease Bad killing sheets are expensive and disheartening, and a loss to New Zealand and Britain.

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Extension of Seed Wheat Certification

By J. H. CLARIDGE, *Agronomist, Wellington.*

WITH the gradual return to normal conditions, the Department of Agriculture has considered the extension of the seed wheat certification scheme beyond the limited scope applying during the war. Under the pre-war scheme any area which had been sown with Certified seed was eligible for re-entry, and many crops sown with seed approaching the borderline were entered for certification, whereas quantities of seed of much higher quality were lost sight of. As a result the percentage of rejections was always high.

DURING the war a restricted scheme of certification was in operation, and entries were in general confined to areas sown with seed produced by the Agronomy Division of the Plant Research Bureau or by Lincoln College. The seed sown by these institutions was hot water-treated seed obtained from recent reselection, so that full use was made of the highest-quality seed available for further seed production. By this procedure rejections have fallen to a negligible number, and as a result the Department has decided to continue with this wartime scheme but to extend its operation by a further generation.

Designation of Grades

The various generations of seed will be designated in a similar way to that applying for grass and clover seeds, thus:—

1. **Certified Pedigree Seed:** This will be the highest grade of seed sold, and will be produced by the Agronomy Division itself, or by Lincoln College from stocks supplied by the Agronomy Division. In either case the seed sown for the production of Certified Pedigree seed will be hot water treated.

2. **Certified Mother Seed:** Areas sown with Certified Pedigree seed will be eligible to produce Certified Mother seed, and this seed in turn may be used to establish areas for further certification.

3. **Certified Standard Seed:** This will be the lowest grade of Certified seed, produced from areas sown with Certified Mother seed. Areas sown with Certified Standard seed will not be eligible for entry into certification, this class of seed being intended for use in sowing areas for commercial grain production.

By regulating the amount of seed of each variety being certified in the Pedigree class, it will be possible to have some control over the production of all classes of Certified seed, thus assisting to maintain adequate supplies for ordinary sowing purposes without serious over-production. The quantities of Certified Pedigree seed required for this purpose are estimated to vary from only a few bushels of several varieties to several hundred bushels of Cross 7.

Distribution of Seed

In general the total quantity of any one variety required is very limited, and the Department has therefore arranged for the distribution of Certified Pedigree seed to receive special consideration. The problems involved have been discussed with grain, seed, and produce merchants' associations, which have agreed to co-operate in the distribution of this seed along the following lines:—

1. The total quantity of Certified Pedigree seed of each variety to be distributed will be allotted among the wheat-growing districts interested in the growing of that variety.

2. The allocation of Certified Pedigree seed for a particular district will be supplied to a merchant nominated by the local grain, seed, and produce merchants' association, who will undertake to have it sown out under suitable conditions by local farmers.

3. The resultant crops will be entered for certification and, if complying with the required standards, the produce will be certified in the Mother class.

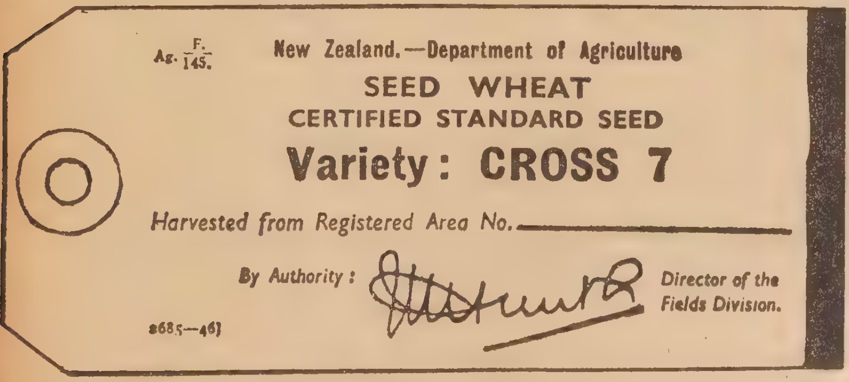
4. The Certified Mother seed so produced will not be at the disposal of the merchant arranging for its production, but will be distributed among the members of the particular association, and perhaps in specific cases of a neighbouring association also, in accordance with the requirements of the clients of each merchant.

Thus each merchant will have for disposal a supply of Certified Mother seed which will be sown out to produce in the following season the requirements of Certified Standard seed for the district.

Reducing Rejections

It is fully expected that these proposals will keep the proportion of crop rejections to an absolute minimum, and at the same time provide seed wheat of a generally higher standard than before the war. At the same time it will enable all districts interested to receive a distribution of the best seed available so that further multiplication of Certified seed can be undertaken within the district.

Finally, it is hoped that some regulation of the total quantity being certified may be made so that the total production of Certified seed wheat will be in line with requirements.



Ag. F./145.

New Zealand.—Department of Agriculture

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8685—46]

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Propagation of Small Fruits

SUCCESS OF RASPBERRY PLANTATIONS DEPENDS ON CHOICE OF STOCK

By J. P. HUDSON, *Horticulturist, Wellington.*

IF soil, moisture, and climate are favourable, and proper cultural routine is followed, the productive capacity of a raspberry plantation will depend to a great extent on the standard of the canes planted. Raspberry canes used for planting should be true to name, of a proved high-yielding strain suitable for the locality, free from "rogues" (either chance seedlings or other named varieties), well rooted, and reasonably free from virus disease, fungus disease, and insect pests. **A prospective grower should seriously consider delaying planting raspberries rather than accept and plant canes which do not measure up to these specifications.** First-class plantations with a long and profitable life can come only from first-class material, and a grower who plants canes which are below standard is putting his plantation under a heavy handicap from the outset.

TO plant young canes taken from a plantation which is failing is clearly wrong, as they are likely to be affected by fungus diseases, which are thus introduced into the new plantations; or, even worse, they may be infected by virus disease, which makes failure of the new plantation certain. Virus diseases are progressive: A plantation gradually becomes more seriously attacked, and there is little chance of improving its health by roguing. If canes are taken from a plantation containing virus disease (and the incidence of virus diseases on raspberries in New Zealand has not yet been fully investigated), the new planting will start at the stage of infection which the old plantation has reached.

Seedling Canes are Worthless

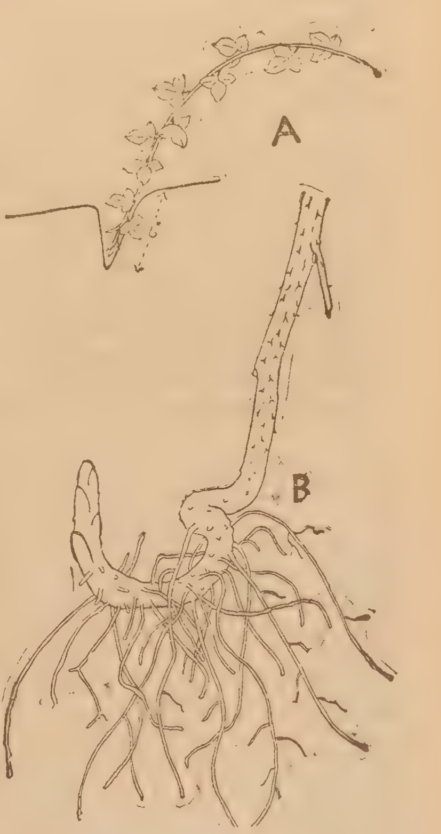
Moreover, seedling canes are constantly appearing in commercial plantations. Few growers remove them all as they appear, and some seedlings may be included in canes lifted from fruiting beds, especially as they are lifted in winter when there are no leaves to help identification of the seedlings, which often produce vigorous canes but are worthless for fruiting.

The health, identity, and cropping capacity of raspberry canes taken from fruiting beds can be judged only by inspection of the canes during the fruiting season, and the prospective purchaser should buy canes only from beds on which he has seen the previous fruit crop and on which he is satisfied that the stock is true to name, healthy, vigorous, and cropping well.

Loganberry Propagation

Loganberries are usually propagated by tip layers, which can be taken from fruiting beds without seriously interfering with the work of the plantation. In late summer, when growth of the new canes has practically finished, the end of each cane should be buried for 6in. in a hole scooped in the ground as illustrated. The part of the cane which is buried will root strongly, and the end of the cane usually grows a little and appears above the ground by autumn. The rooted layers can be dug up in late autumn or the following spring and planted out either into their fruiting quarters or, preferably, into a nursery bed where they are grown on for a season to produce large, well-rooted

One system of training loganberries or boysenberries is to have a double wire fence. The canes which will fruit next year are shown tied to the left-hand wires. Next year's new canes will be tied to the right-hand wires as they grow, thus keeping them off the ground and out of harm's way.



Propagating loganberries from tip layers. The end of each cane is buried in late summer as shown at A. By late autumn the tip will have rooted (B) and will usually have produced a shoot above the ground. It is then ready to be severed from the parent cane by cutting a few inches above the top roots.

Figures after Technical Communication No. 14 of the Imperial Bureau of Horticulture and Plantation Crops.

plants for planting out into their permanent positions the following autumn.

Though propagation in this way can be carried out with little interference with the work of the plantation, it sometimes means that tying in the new canes has to be unduly delayed, especially if the weaving system of training is followed, as the new canes cannot be tied in until their tips have rooted and been severed.

Instead of propagating from the fruiting plants, there is much to be said in favour of planting a few stools in a spare corner and using them solely for stock raising, cutting off all canes nearly to ground level every winter and rooting the tips of each new cane that grows from the stools. Twenty or 30 new canes are often produced by each stool treated in this way, whereas not more than 6 or 8 canes to a crown are usually left in a fruiting plantation.

Not only does this method ensure a rapid rate of increase, but the young plants produced are less likely to be affected by cane diseases, as there is no old cane from which infection may spread.

Training Loganberries

New canes of loganberries, youngberries, boysenberries, etc., are now well developed and must be protected against accident, as broken canes cannot now be replaced by new growths and a shortage of new canes means less fruit next season. If the new canes are allowed to sprawl over the ground between the rows, a few are almost certain to be damaged by pickers.

One method of handling the young canes is to lay them parallel with, and under, the bottom wire, keeping them in that position by stakes. That certainly serves to keep the canes out of harm's way, but it is doubtful if they get enough sunshine to ripen them off properly. Moreover, fungus spores, washing down in rain drips from the fruiting canes above, are certain to infect the young growths below with any diseases present.

Wherever practicable, both on commercial plantations and in the home garden, it is advisable to tie in the young canes to some support, either to the side of, or preferably above, the fruiting canes so that they are protected from accident, less likely to be infected by fungus disease from the old cane, and in a sunny and airy position. Overseas commercial growers have devised several ways of training young canes in this way, one of the most popular methods being to tie the new canes in a bundle to an extra wire fixed above those to which the fruiting canes are tied. When the old canes have been cut out, after the fruit has been harvested, the new canes are brought down and trained to the lower wires in the usual way.

Conserving Soil Moisture in the Orchard

By J. E. HUME, *Orchard Instructor, Tauranga.*

CONSERVING soil moisture is a phase of orchard practice of great importance and has a far-reaching effect on the trees. Not only does it influence the size and quality of the present season's crop, but it has a considerable effect on the ensuing one. Much of the plant food that has been built up in the soil may be lost to the plant if the soil moisture is allowed to fall rapidly or over long periods, particularly if the weather is hot and dry.

IN orchards where clean cultivation is practised, light harrowing should be carried out—just sufficient to keep the surface free of robber weed growth. Where possible trees should be mulched with some suitable material such as old stack bottom. The soil should never be cultivated deeply in dry weather; nor should the surface be left uneven, as that tends to expose a greater area to the drying effect of sun and wind.

Where the orchard is in permanent grass and cultivation is carried out only round the trees, mowing of the grass should be at frequent intervals during dry weather to reduce the transpiration of moisture, which may be seriously lessening the supply available to the tree roots. Moisture conservation is also assisted by leaving each alternate mowing where it falls; to some extent that protects the roots of the pasture from the effects of the dry weather, and at the same time helps to build soil fertility.

Mulching round the trees in dry weather with some quick-decaying vegetable matter is recommended, provided it contains no resinous substances likely to build up in the soil and become toxic to the trees or harmful to the beneficial soil bacteria.

Do not put mulch material right against the butts of the trees, as that contact may lead to bark troubles that are difficult to control. Always keep at least a 3in. air space round the bases of the trees.

If weed growth has got out of hand during dry weather, it is better to mow it first and then skim cultivate rather than deep cultivate in an endeavour to turn it in all in one operation.

Cover Crops for Humus

Increase the humus content of the soil by turning in cover crops. Blue lupins, partridge peas, and red clover (all legumes), oats, black barley, and mustard are suitable. Seedings should be made not later than mid-March except in the case of mustard, which can be sown as late as mid-April. Approximate seedings to the acre are: Lupins and peas 2 bushels, oats and black barley 60 to 80lb., mustard and red clover 6 to 8lb.

Though crops can be seeded earlier to suit convenience and local conditions, care must be taken not to sow a crop so early that it becomes a competitor with the trees for moisture, particularly in hot, dry weather. Manuring these crops with serpentine superphosphate, 2cwt. an acre, is recommended.

In orchards where the surface is permanently grassed a topdressing with the same amount of fertiliser will stimulate the development of good-type grasses and help to suppress weeds and poor-type grasses.

[*Sparrow Industrial Pictures Ltd.*

Cover crop of blue lupins in an orchard.

PASPALUM

By **P. S. SYME,** *Instructor in Agriculture, Warkworth.*

THAT many farmers have a full understanding of the need for the specialised management of paspalum in a mixed sward is clearly indicated by their excellent pastures. Nevertheless there are numerous farms where paspalum could perhaps be utilised to better advantage. This article outlines some points in the management of paspalum which will be of particular interest to farmers in districts where this grass is a vigorous and aggressive grower.

MANY farmers will remember the heated controversy which followed the introduction of paspalum, and the fears so commonly expressed that this aggressive newcomer would eventually take complete possession of all the best farming land in the warmer districts of the Auckland Province. Time has proved that these fears had some foundation; paspalum during the summer is now almost universally dominant throughout the province, where the soil and climatic conditions favour its growth. Fortunately, however, far from being catastrophic, the introduction of paspalum has proved to be of considerable value. To many farmers it has brought not tribulation but salvation.

Although it is admirable in many respects, not even the most ardent advocates of paspalum would claim that the grass is altogether perfect. Being a very vigorous grower, it is apt to smother slower-growing species, and, if not properly controlled, is liable to take complete possession. This is not the fault of paspalum so much as the fault of the farmer. Under good management it has been well demonstrated that paspalum can live in harmony with other species, and it is in fact claimed by some authorities that the good ryegrass-white clover-paspalum pasture is the highest-producing pasture in the world. All that paspalum requires is the judicious use of the curb as well as the spur.

Establishing Paspalum

In the warmer districts paspalum is commonly included in seed mixtures at the rate of about 6 to 8lb. to the acre. Unfortunately, when sown in this way in the autumn paspalum usually makes very slow establishment, six or seven years often being required to produce an appreciable proportion in the sward. When it is considered that the germination of the seed is commonly about 50 per cent., and that the species likes warm conditions both for germination and growth, it is apparent that it suffers from a considerable handicap when competing with a mixed sowing of winter-hardy grasses and clovers at a period when

A well-balanced sward ready for cutting as an early hay crop. Under good management paspalum can be made to grow in harmony with ryegrass and white clover. Competent authorities claim that the good ryegrass-white clover-paspalum pasture is the highest-producing pasture in the world.

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Head Office: COURTENAY PLACE, WELLINGTON both soil and atmosphere are daily becoming colder. Obviously, much autumn-sown seed will either fail to germinate or will establish poorly owing to cold and competition. Seeds which fail to germinate before the temperature falls too low must face an almost insurmountable handicap—even if they still germinate in the spring—from the competition of the other strongly-growing established species.

Spring Sowing

To avoid some of the drawbacks of autumn sowing, farmers sometimes resort to spring sowing. Experience has frequently shown that where paspalum is sown by itself at about 10 to 15lb. to the acre on a well-prepared seed-bed when the land has warmed up in November, almost every live seed will germinate and establish a plant. Unlike autumn, spring is a period of rising temperatures, and with no competition the young paspalum plants make very rapid establishment. The success of this method is obviously dependent on sufficient rain in the early stages after sowing. On the other hand, should the season prove too kind, the growth of paspalum may be so strong as to prejudice the successful sowing of the other grass and clover elements in the autumn. For this reason nice judgment is needed in the application of fertiliser when sowing the paspalum, and if the soil appears of even fair fertility, it may be unwise to apply any fertilser at this time.

Instead of sowing the paspalum alone, some farmers include a small quantity of the seed when sowing such crops as turnips or millet when it is intended to sow the land down in permanent pasture in the autumn.

With spring sowing, the farmer risks little more than the cost of the seed. If successful, this method may result in better establishment of paspalum in six months than is usually obtained in the same number of years with the normal autumn sowing. The drawbacks are that further working of the land during the summer is impracticable, and that cultivation immediately before the sowing of the ryegrass and clover may be restricted by the presence of the paspalum. The competition of the paspalum may also prejudice the establishment of the ryegrass and clovers.

Despite the drawbacks of spring sowing, the advantages of the quick establishment of paspalum are very real, and most experienced farmers will readily agree that any risks incurred may be thoroughly justified.

Maintaining Proper Balance

Although paspalum establishes slowly in a young pasture, its habit of growth is apt to lead to dominance. Its vigorous summer growth combined with its height may enable it to smother out and suppress other elements in the sward, particularly the white clovers. Once the clover has been eliminated the ryegrass also disappears for lack of the essential nitrogen provided by the clovers. The paspalum, with its ability to survive even in spite of the fall in fertility, is then left in possession, and, unless the ground is very fertile, it tends to form that characteristic sod-bound mat so common on many of the poorer pastures. That this unthrifty, sod-bound condition is primarily caused by the lack of clover and the consequent fall in fertility, rather than to any inherent defect in the paspalum, is a matter of common knowledge; much depends on management.

Even late in the season surplus paspalum growth can be made into excellent silage without risk. The removal of the rank paspalum is essential for the regrowth of the ryegrass and clover in the late autumn and helps to maintain a properly-balanced pasture. With modern machinery pit silage can be made with very little trouble.

Control is Important

If the paspalum is properly controlled and the fertility of the soil maintained at the level needed by ryegrass and white clover, these three species can continue to live in complete harmony. Under good management paspalum will provide an abundance of good feed in the summer and early autumn, and with the advent of the colder weather will give way to the ryegrass and clover, which in turn will achieve dominance in their season. Ryegrass and paspalum are complementary rather than competitive, and their natural sequence of growth can be used to reduce the dormant period of a pasture almost to zero.

Common sense suggests that, if paspalum is permitted to become rank in the summer and allowed to shade the ground throughout the autumn until roughly eaten down in the winter, the ryegrass and clover must inevitably disappear from a pasture. Their survival under such conditions would indeed be surprising.

Obviously, control of paspalum involves some measure of controlled grazing, and may necessitate closer subdivision and the use of the mower. With adequate subdivision, pasture growth can be used to full advantage. Smaller fields allow of better grazing control and reduce the need for wasteful topping, at the same time permitting an additional acreage to be conserved for hay or silage. Paspalum makes good hay, and even late in the season it can be made into silage.

In this way any surplus summer growth can be properly conserved and the ground made available for what is in effect an extra crop of ryegrass and clover, thus providing still more feed and at the same time replenishing the essential store of nitrogen needed for the vigorous growth of ryegrass and paspalum alike.

The practice of relying on a carry-over of rank growth to provide some late autumn and winter feed may be economical of labour, but it is highly detrimental to the ryegrass and clover, and is one of the commonest causes of the reversion of a sward to pure paspalum and its consequent short producing season.

Renovating Sod-bound Pastures

Various methods have been successfully used to renovate sod-bound paspalum pastures. One common method is to plough the land, preferably in the autumn, the furrows being made narrow and not too closely packed together. Treated in this way, a low-producing paspalum sward is completely revitalised and makes vigorous growth in the following season. This method also allows of the introduction of ryegrass and clover seeds to produce a better-balanced sward. Alternatively, the land can be disced or severely harrowed to loosen up the ground and later surface sown with rye and clover seed. Where cultivation is impracticable heavy stocking combined with feeding out hay is a method commonly practised, either for introducing ryegrass and clover into a paspalum sward or for introducing paspalum into a ryegrass sward. The results obtained in this way have proved somewhat variable, success depending in some measure on the type of hay—paspalum or ryegrass—and on the stage of ripeness at the time of mowing.

It should be clearly understood, however, that whichever method of renovation is adopted, the fertility of the soil must be raised to the requisite level for ryegrass and white clover, and this implies close attention to liming and manuring. Furthermore, the work will be largely wasted if previous errors in management are repeated. It cannot be too strongly emphasised that the important link binding the harmonious partnership of paspalum and ryegrass is the clover.

If, through over-shading, lack of fertility, or any other cause, the clover goes out, it is almost certain that the sward will revert to pure paspalum, and, where the natural fertility is low, will again become sod-bound and unthrifty.

In a warm climate paspalum can produce well on rich soils, or survive on quite poor soils. It can also tolerate a wide range of wetness or dryness and withstand dense shading. Considering its proved adaptability and its immense value at a time when most other grasses fail, paspalum is indispensable for sustained high production.

If properly managed, it will remain a good servant, but whether its presence is to prove a boon or a curse depends on the farmer himself. The decision rests not with the grass but with the man.

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PREPARATIONS FOR GREENFEED CROPS IN SOUTH ISLAND

USE OF FALLOWS AND HARVESTED AREAS

By E. B. GLANVILLE, *Assistant Fields Superintendent, Auckland.*

THE provision of greenfeed for feeding to stock during the coming autumn, winter, and early spring should now be given much thought by farmers, particularly by those who practise arable farming in the South Island. Land which has been fallowed and areas from which grain crops are to be harvested should be used in this manner.

WITH the lean period of grass growth ahead, farmers would be well advised to make preparations now for the sowing of areas with suitable crops which will provide nutritious feed to carry stock through the late autumn, winter, and early spring. On most South Island farms some fodder crops will have been sown during the spring and summer, but it is still necessary to use available fallow land, and land from which cereal crops will be harvested, for more fodder crops to ensure that adequate feed supplies are on hand for the periods when grass growth is dormant.

Suitable Crops

Several crops can be grown now to supplement pasture and fodder crops which were sown during the spring. These include barley, oats, Italian ryegrass and red clover, and soft turnips.

Barley is suited to warm, dry conditions, but will not provide as much feed in the winter as will oats or Italian ryegrass and red clover sown early. January sowings of Cape or Black Skinless barley will provide greenfeed ready for grazing in late February and March, with, of course, subsequent grazings. Sowing at the rate of 2½ bushels an acre is best done through every coulter of a grain drill followed by tine harrowing to cover the seed. Barley can be sown broadcast, and when this method is adopted the seeding rate should be increased to 3½ bushels an acre, followed by a light stroke of the disc harrows, and finally tine harrowing to ensure covering.

January-sown oats (Algerian) will be ready for grazing in late March and will provide further grazings of greenfeed through the winter. As with barley, oats are best sown through every coulter of a grain drill, the rate of seeding being 3 bushels an acre.

January and February sowings of soft turnips will provide winter feed, but there is a risk in sowing this crop when conditions are dry. Rain is required to germinate the seed, and subsequent rains are necessary to keep this crop growing. Sowing at the rate of 10oz. an acre through every other coulter of a grain drill with small seed sower attachment is the best method of establishing a soft turnip crop. Special turnip coulters on the drill are advisable to prevent the seed being sown too deeply. If a suitable drill is not available, soft turnips may be sown broadcast and lightly tine harrowed after sowing to cover the seed. The seeding should be increased to 1lb. an acre when sown by this method.

February sowings of barley, Algerian oats, Italian ryegrass, and red clover will provide greenfeed from early winter onward, and the Algerian oats should continue producing feed into the early spring.

Ryegrass and Clover

March sowings of Italian ryegrass and red clover provide valuable greenfeed in the early spring, particularly during August and September, when the feed shortage on farms is most acute. More care should be taken with the preparation of the seed-bed for this supplementary crop than need be taken with barley and oats. The seed, though often drilled in through every coulter of a grain drill, is more often sown broadcast and covered with a light tine or brush harrow. Both methods are satisfactory and the rate of seeding should be 1 bushel of Italian ryegrass and 6lb. of broad red clover an acre.

The sooner a start is made with the sowing of these supplementary crops, the earlier will be the production of greenfeed. Late sowings will not produce feed for the winter; consequently fallowed land should be sown during January, and areas yet to be harvested should be worked for immediate sowing as soon as the harvesting of early grain crops has been completed.

COCCIDIOSIS OF POULTRY

"Sulpha" Drugs Offer New Hope of Control

By W. G. FISCHEL, *Veterinary Research Officer, Animal Research Station, Wallaceville.*

COCCIDIOSIS, one of the most dreaded infectious troubles in poultry flocks of both the North and South Islands, was until quite recently known to be not amenable to medical treatment. With the advent of the "sulpha" drugs as a means of treating infectious human and animal diseases has now come the opportunity of the efficient control of this trouble also.

HUNDREDS of drugs and many feeding methods have been tried to combat this major scourge of New Zealand's poultry flocks, but the inefficacy of all those attempts at prevention or treatment was clearly demonstrated in all instances when controlled experiments were carried out.

Even the increased use of milk or milk products (milk flush) as recommended since 1915 has lately been found not to have the desired beneficial effects in all cases.

The addition of flowers of sulphur to the mash was advocated as a preventive method in 1936, and has been used widely since that time. However, sulphur was found to have no curative value once the disease is established, and when fed in amounts exceeding 2 per cent. of the ration it produces "sulphur rickets" in chicks not exposed to direct sunlight or not given an overdose of vitamin D in the form of a potent fish oil. Even in the early years of this decade it was still maintained by the authorities that sanitation and encouragement of feed consumption were the only available measures for the successful control of the infection

Only since scientists found the astonishing action of sulphanilamide and similar compounds against many different disease-producing organisms was there hope again of finding a drug which might destroy or at least inhibit the parasites in the intestines of the affected birds without damaging the cells of the intestinal lining.

It was first found in 1935 that sulphanilamide, indeed, was effective in checking the development of some types of coccidia inhabiting the small intestines of fowls; it was, however, ineffective against the most dreaded form of coccidiosis of the blind gut (caeca), and in larger doses even caused symptoms of poisoning.

Many other drugs of the "sulpha" group have since been tested for their efficacy against the various forms of coccidiosis as a treatment and preventive with varying success. So far sulphaguanidine, sulphadiazine, sulphamerazine, and sulphamezathine have been shown to be of value in the treatment of outbreaks of coccidiosis in many experiments carried out in England and the U.S.A.

Only the last-mentioned drug—sulphamezathine, or formerly called sulphamethazine—has been tested experimentally here in New Zealand for its action on caecal coccidiosis, and treatment under field conditions in actual outbreaks has repeatedly proved its great value in the control of this infection which is so prevalent in both islands. These encouraging results warrant a wider use of this drug, especially since with the end of the war larger amounts of the drug, which formerly was ear-marked almost exclusively for human use, have been set free for veterinary purposes.

Drugs for the treatment of poultry must be easily administered in the food or the drinking water, as individual treatment of large flocks would be much too time consuming and costly. Both forms of administration of sulphamezathine have been tried successfully in outbreaks of caecal coccidiosis, and it appears that the other types of coccidiosis affecting the small intestines also are equally amenable to the action of this drug.

Sulpha drugs generally do not destroy the various disease germs, but they inhibit their multiplication and provide an opportunity for the invaded body to get rid of the attacking organisms. The same is also the case with coccidiosis, where the drug, when present in sufficient concentration, checks the activity and multiplication of the parasites in the cells of the intestinal lining. At the same time it inhibits to a large extent the formation of the resistant forms—the oocysts, the means of transmission to other birds in the pen

When the drug was administered to experimental chicks either before being artificially infected with caecal coccidiosis or from the time of infection it was found that the outbreak of the disease was prevented. When treatment was commenced in groups of infected chicks after five days, at which stage evidence of the disease was observed in the form of blood-stained droppings, it was not only found that these chicks showed a greatly-decreased rate of mortality when compared with untreated control chicks, but that these birds recovered fairly soon, and the droppings became normal in a few days. Chicks that had overcome the infection with the help of the drug were, moreover, found to be resistant against subsequent infections with the same type of coccidia, thus demonstrating the existence of an effective immunity.

In small experimental pens of artificially-infected chicks effective control was achieved by the administration of the drug for 3 or 4 days after blood was first noticed in the droppings. Under the conditions of a natural epidemic of caecal coccidiosis in large brooder pens, when the disease is transmitted gradually from the affected chicks to their pen-mates, it is necessary, however, to continue the treatment longer until no more blood is visible on careful examination of the droppings. In outbreaks of coccidiosis of older birds (coccidiosis of the small intestines) treatment should be continued for at least 1 to 2 weeks.

Drug and its Administration

The drug sulphamezathine has a complicated chemical formula and consists of a sulphonamide and a pyrimidine group chemically linked. Only the pyrimidine compounds of sulphonamide were found to be active in the control of coccidiosis. The drug is a white, crystalline, very stable powder and may also be obtained in the form of 0.5 gramme tablets. In contrast to sulphanilamide and most of the other drugs of this group sulphamezathine is less toxic and in effective doses is generally much better tolerated by animals. When used within the range of dosage recommended there is no danger of any ill effects or even retarded development of the chicks.

The drug can be administered either in the mash or in the drinking water. Both ways were found equally effective in maintaining the necessary concentration of the drug in the body fluids, although administration in the drinking water might be less wasteful and ensures the intake of the drug even in cases when the appetite of the chicks is impaired by the in-

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flammatory condition of the intestines characteristic of coccidiosis.

(a) **Dosing with the Drinking Water:** A saturated solution of the drug in water is substituted for the drinking water of the chicks as soon as blood is observed in the droppings of the chicks or the disease is suspected for some other reason. All other water should be withheld at the time of treatment. The drinking vessels should be of earthenware or glass, or, if made of galvanised iron, should be new or at least in good condition. When old troughs in which the iron is much exposed are used, chemical interaction occurs, which reduces the strength of the solution considerably. In these cases all surfaces exposed to the fluid should be coated with petroleum jelly before use. Fresh solution should in any event be prepared daily to ensure full strength.

For preparation of the solution one 0.5 gramme tablet or 8 grains of the powder are dissolved in one pint of hot water with a constant stirring. To prepare large quantities of drinking water a concentrated suspension may be prepared by stirring 60 tablets or 1oz. of the powder into 1½ pints of boiling water, and then use ½oz. of this stock for every pint of drinking water (1 pint for 5 gallons). The concentrated suspension should be shaken up before measuring the required amounts.

The requirements of sulphamezathine for a 4 days' treatment of 100 chicks of varying ages are given in table 1 above, based on the average water consumption found on repeated tests.

TABLE 1

Age (weeks).	**Average water consumption. 100 chicks in 4 days.**	**No. of 0.5 gramme sulphamezathine tablets.**
	Gallons	
1-2	**2½**	**20**
2-3	**3**	**24**
3-4	**4½**	**36**
4-5	**6**	**48**
5-6	**8½**	**68**

TABLE 2

Age (weeks).	**Average food consumption. 100 chicks in 1 week.**	**Dosage of sulphamezathine powder. 100 chicks in 1 week.**
	lb.	**oz.**
1-3	**19**	**1**
3-7	**37**	**2**
7-10	**95**	**5**
10-15	**119**	**6**
15-20	**149**	**7½**
20-24	**163**	**8**
24-28	**175**	**9**

(b) **Dosing with the Feed:** The drug in powder form is mixed with the mash supplied to the chicks at the rate of ½oz. to every 10lb. of dry mash, mixing it well with a small quantity of the mash before incorporating it in the full amount.

In table 2 above the approximate requirements of the drug based on the average food consumption at various ages are given.

Sulphamezathine is a Schedule IV poison and therefore obtainable only on veterinary prescription. Supplies can be ordered through the local chemist or larger quantities in multiples of 1oz. of the powder or of 100 tablets can be obtained from drug wholesale firms.

Birds undergoing treatment with sulphamezathine and recovering from the infection will become immune to further attacks of the type of coccidia concerned. There is therefore no necessity to attend rigidly to sanitation measures usually carried out in outbreaks of coccidiosis or to move the birds to fresh ground. Affected pens, however, should be kept isolated as well as possible to prevent the infection from spreading to untreated pens.

The Potato Tuber Moth

THE potato moth is a most destructive pest in the potato crop and is very prevalent in the Auckland district, where the mild climate favours its activities. There are two broods of moths. The winter brood (the caterpillar from which attacks the potato tops) may destroy the young plants; the moths of the second brood deposit their eggs on the potatoes while they are lying in the field after digging. When potatoes are grown in heavy soil the moths will crawl down the cracks in the soil which develop during dry weather and deposit their eggs on the tubers below the surface. They also attack tubers in storage if care is not taken to store them under good conditions.

A moth lays from 20 to 30 eggs, and when hatched the young grubs usually feed on the eyes of the potatoes; they then tunnel toward the centre of the tubers, inducing decay. The eggs are minute, white, and glistening. They hatch in from 6 to 10 days into a caterpillar which when fully grown is about ½in. long, of a faint pinkish colour with a brown head. It usually pupates under the skin of the potato and is surrounded or protected by dirt. In the chrysalis stage it is dark brown and enclosed in a silken cocoon.

The moth is small and light brownish-grey. The body of the female moth is about ¼in. long. The front wings, which are darker than the hind ones, are about ½in. across when expanded; those of the male moth are smaller. The wings have a feathery appearance, which is less pronounced in the male than in the female.

Little infestation is likely in crops which are kept adequately moulded up before harvesting, but where moulding has been carelessly carried out or harvesting has been delayed in the Auckland district and the ridges have fallen away, leaving some tubers exposed, moth infestation is sure to take place. After being lifted the tubers should not be left on the ground before being picked up, as the moths will deposit their eggs on a large number of tubers in a few hours.

In districts where the potato moth is prevalent the tubers should be bagged immediately they have been lifted, and carted into a store room where they can be covered to prevent the moths obtaining access to them. A common practice with some growers of heaping the potatoes up in a store room without any covering is most undesirable, and is not followed by growers who have experienced the ravages of this pest.

To prevent development of the moth all dead potato tops, small potatoes, and rubbish should be gathered and burned after a crop has been dug. Sacks and cases in which infected potatoes have been stored should be dipped in boiling water to destroy grubs and chrysalids. Treating the crop with an arsenical spray will give a certain degree of control when the moths begin to appear, killing the young grubs as soon as they start to feed their way down the stems of the plant to the tubers.

E. B. GLANVILLE,
Assistant Fields Superintendent,
Auckland.

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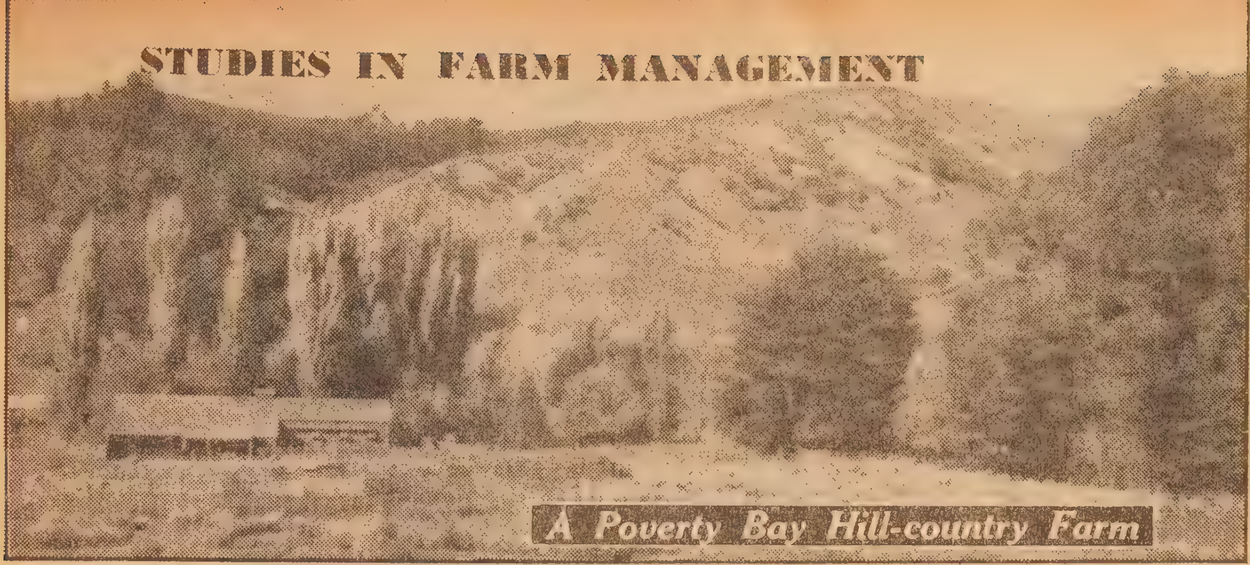
STUDIES IN FARM MANAGEMENT

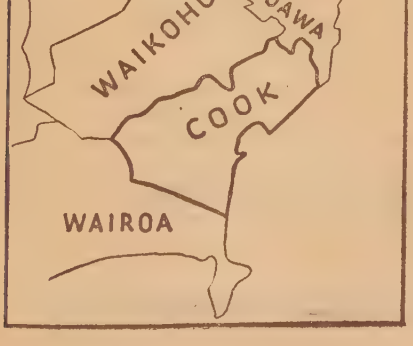


A Poverty Bay Hill-country Farm

THROUGHOUT New Zealand there are many districts which have hill-country farm lands ideally suited to the raising of sheep and cattle, and in this respect Poverty Bay and the east coast are particularly favoured. The rich, fertile papa and mudstone soils combined with an adequate rainfall lend themselves to the development of highly-productive hill-country pastures. As a result breeding ewes and cattle raised on the Poverty Bay and east coast hills are always in very keen demand by buyers from other districts. The following article describes the management of a typical hill-country farm in the Cook County, Poverty Bay.

By V. P. BOOT, *Fields Instructor, Gisborne.*

WITH no extremes of hot and cold and having only mild frosts—an isolated one perhaps reaches 10 degrees—the climate of the Cook County is ideal for farming. The average annual rainfall is 43.41in., with a minimum of 26in. and a maximum of 60in. Generally the hill country receives more rain than the coastal area and the heaviest falls usually occur during May, June, July, and August, the average heaviest fall being 5.12in. in May. During the rest of the year the rainfall normally is fairly evenly distributed.



Soil Types

Hill-country soil is composed largely of papa, argillaceous mudstones, and some sandstones, and the soil of the rich alluvial flats is derived from papa and mudstone. Along the river banks the soil has been formed largely by flood silting.

Generally the soils on the flats respond readily to topdressing with phosphates and have sufficient free calcium for plant food requirements. However, in certain areas, before maximum results can be obtained from phosphates, carbonate of lime has to be applied to correct the soil's condition.

Statistical Data, Cook County*

Total occupied area (acres)	501,295
Number of horses	3,384
Number of cattle	103,668
Number of dairy cows in milk	9,797
Number of pigs	4,608
Number of sows 1 year old and over	684
Number of sheep shorn	688,006
Number of lambs shorn	232,773
Number of lambs tailed	370,446

* A. and P. statistics, 1943-44.

A MURIWAI FARM

Although the farm has a greater area of flats for fattening stock than is usual, the management of the property of Messrs. C. H. and H. C. Williams is typical of that of most farms in the Cook County. Situated a quarter of a mile from the township of Muriwai, which is 16 miles from Gisborne on the main Gisborne-Napier highway, the farm was originally part of the Wairakaia Estate of 9,000 acres, which was purchased by Archdeacon Samuel Williams in 1905 and subdivided into five properties. The Williams brothers took over two adjacent blocks, which they have since farmed on a communal basis.

The two blocks, known as Sherwood and Coventry, were about 2,200 acres and 1,740 acres respectively, a total of 3,940 acres. Some years later 60 acres of alluvial flats were purchased, bringing the total acreage of the holdings up to 4,000 acres.

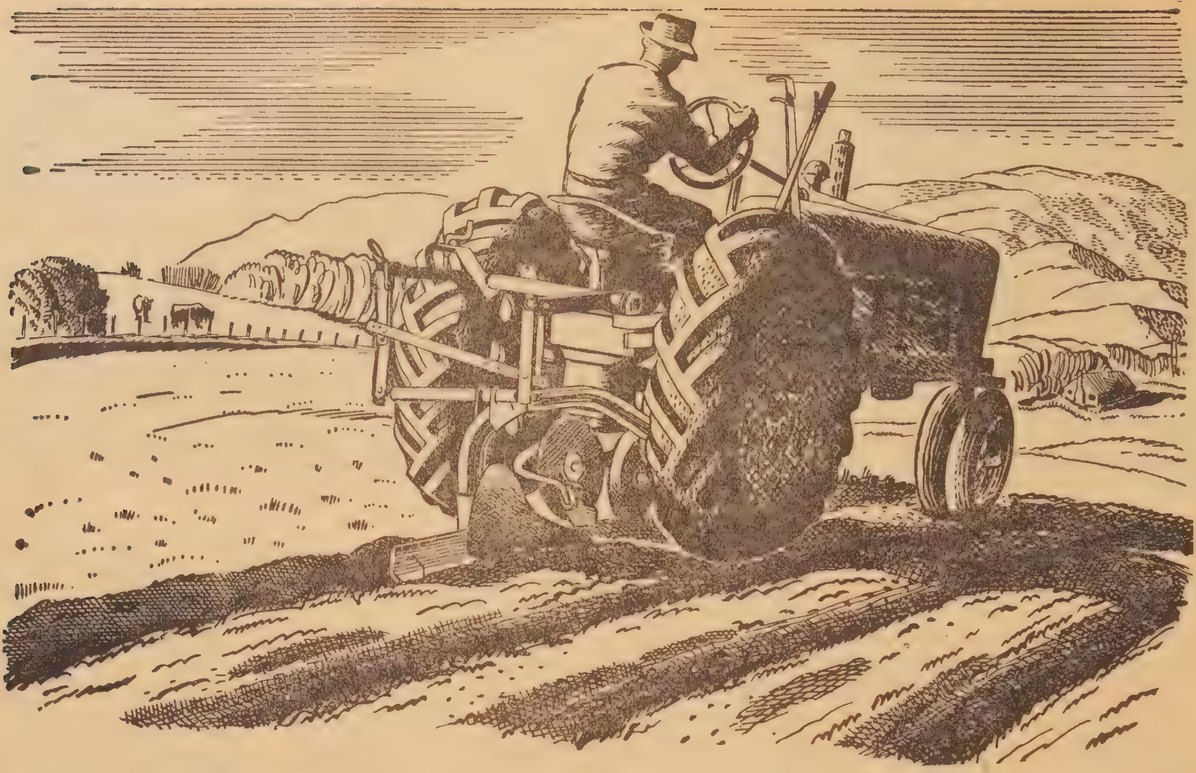
When Messrs. Williams commenced farming the property in 1905 most of the bush, which consisted largely of kohe-kohe, rewarewa, tawa, and kaikawaka, had been felled and burnt and the area sown down in English grasses. Several remaining areas of native bush aggregating 200 acres were, with the exception of a small area, felled, burnt, and sown down during the next five years.

When the property was taken over the paddocks were very large and the fences in an almost complete state of disrepair. The whole area had to be subdivided and new boundary fences erected. Within a few years all sign of the original fencing had disappeared.

The pastures, even though sown down in English grasses, were at that time dominantly danthonia. Owing to the large extent of individual paddocks, much of the growth was uncontrolled and the properties were covered with rank native grass or Yorkshire fog.

Planned Development

It was realised early that to encourage grasses and clovers demanding higher fertility it was essential to have the pastures well



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controlled by stock. This focused attention on closer subdivision so that big numbers of sheep and cattle could be concentrated on to smaller areas and so ensure full utilisation of fodder and a greater return of stock excrements. Consequently, subdivision was planned to facilitate stock control, and additional stockyards and fences were erected on lines which led to easier working of the property.

The areas of the paddocks now are as follows:—

Hill	
More than 400 acres	— 2
300-400 „	— 2
200-300 „	— 3
100-200 „	— 5
Less than 100 „	— 7
Flats	
More than 20 acres	— 1
10-20 „	— 3
Less than 10 „	—25

The closer subdivision undoubtedly paid handsomely, as in three years the originally-sown English grasses re-established and for the most part began to dominate the native grasses. With this improvement in the pastures came increased production in wool, fat lambs, sheep, and cattle.

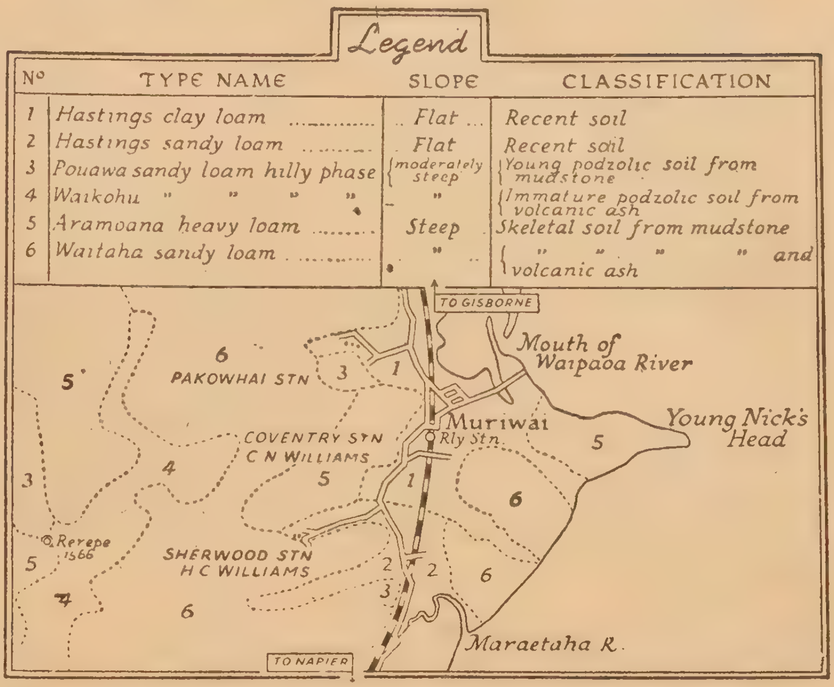
The planning of plantations was linked with the placing of drafting yards. Suitable timber for yard maintenance was planted at, or in the vicinity of, the stockyard sites.

Topography and Soils

The two properties together consist of 3,800 acres of hill country and 200 acres of flat.

There is relatively little difference in the steepness of the hill country. The whole area is moderately steep with some easier country, the highest point on the stations being 1,500ft. None of the hill country is ploughable and development, therefore, has been dependent on stock and pasture management. The soils are mainly of mudstone with several outcrops of limestone and sandstone. The pastures are mainly ryegrass, white clover, dogstail, annual clovers, subterranean clovers, danthonia, and some browntop. Ryegrass and white clover are dominant on the topdressed paddocks, but on the lighter, drier northern slopes danthonia is dominant.

The flats are of rich alluvial soil and grow excellent ryegrass-white clover pastures. Careful use of superphosphate has to be made, otherwise the stimulus to the white clover will result in its marked dominance over the perennial ryegrass. Excellent crops of rape, maize, lucerne, and meadow hay are taken off the flats, and on several occasions very payable white clover seed crops have been obtained.


Legend
Nº TYPE NAME SLOPE CLASSIFICATION
1 Hastings clay loam ... Flat ... Recent soil
2 Hastings sandy loam ... Flat Recent soil
3 Pouawa sandy loam hilly phase {moderately steep {Young podzolic soil from mudstone
4 Waikohu " " " " " {Immature podzolic soil from volcanic ash
5 Aramoana heavy loam ... Steep Skeletal soil from mudstone
6 Waitaha sandy loam ... " { " " " " and volcanic ash
TO GISBORNE
Mouth of Waipaoa River
PAKOWHAI STN
COVENTRY STN
C N WILLIAMS
Muriwai
Rly Stn.
Young Nick's Head
Rerepe 1566
SHERWOOD STN
H C WILLIAMS
Maraetaha R.
TO NAPIER
1
2
3
4
5
6

Classification of soil types on the Sherwood and Coventry stations.

Pasture Development

The felled bush land before 1905 had been surface sown with a 15lb. mixture containing cocksfoot, perennial ryegrass, *Poa pratensis*, and clovers. Since then the mixture used both on bush clearings and on manuka areas which have been cleared from time to time has been as follows:—

Perennial ryegrass	..	20lb.
Poa pratensis ..	..	1lb.
Crested dogstail ..	..	1lb.
White clover ..	..	1lb.
Yarrow	..	1oz.

In recent years some of the home hill paddocks have been surface sown with subterranean clover and paspalum. The paspalum has been very slow in establishment, but on the drier, topdressed hills subterranean clover has done very well.

Through careful management a dominance of ryegrass and white clover over the danthonia has been maintained, except on the dry, hard, steep northern slopes.

Very little surface sowing has been done, the aim always being to achieve a balanced sward through judicious stocking.

Farm Equipment

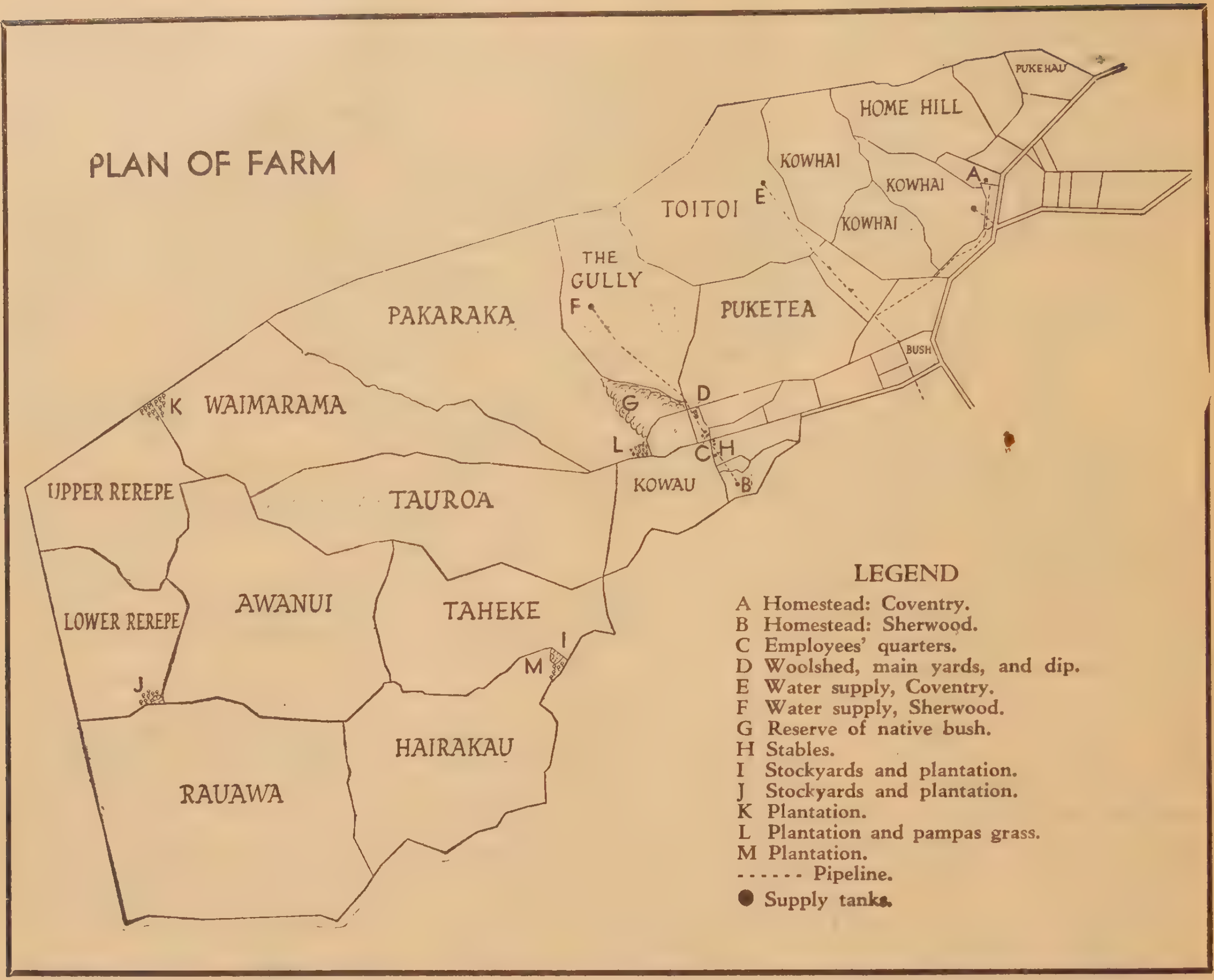
The well-built, spacious woolshed was originally an 8-stand shed, but has been reduced to 6. It contains a well-constructed foot-rot trough with adequate floor space to dry sheep out after passing them through the bath. The modern type of tip-dip is situated by the stockyards and all this equipment is supplied with a plentiful flow of fresh spring water. The main cattle-drafting yards are situated centrally and four other complete yards and two docking yards are at convenient points on the station. The woolshed is constructed to serve as an implement shed, and there are hay barns and stables on the property.

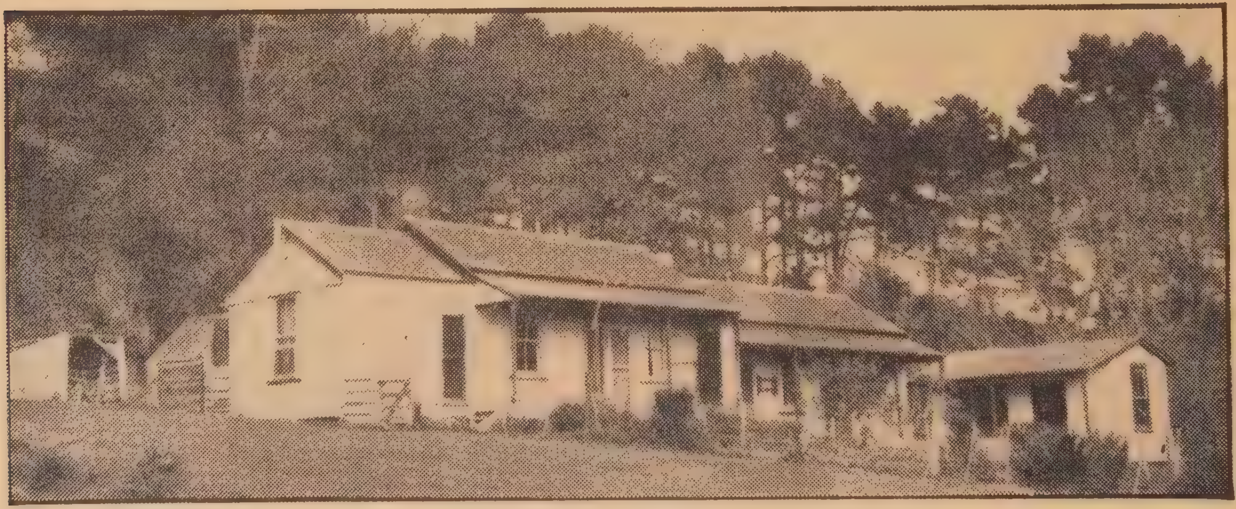
Water Supply

The water supply for the whole property is excellent and even during the recent drought the creeks fed by numerous springs were never dry. The supply for Sherwood is piped about 80 chains from a reservoir which is fed by five springs, and the supply for Coventry is piped about 240 chains and supplies the homestead and all the flat paddocks. The normal supply from this spring is between 5,000 and 6,000 gallons a day. Adequate water is assured under any conditions in all but two paddocks, and it is rarely that the creeks in these dry up. The flat paddocks are furnished with concrete troughs which serve two paddocks at once, and regular supplies are piped from the main spring. There are seven permanent troughs, twelve single movable concrete troughs, and three of tin.

Shelter

Two plantations were planted solely for shelter. An additional twelve


PLAN OF FARM
PUKEHAU
HOME HILL
KOWHAI
KOWHAI
KOWHAI
TOITOI
E
A
THE GULLY
F
PAKARAKA
PUKETEA
BUSH
D
G
K
WAIMARAMA
L
C
H
B
KOWAU
UPPER REREPE
TAUROA
LOWER REREPE
AWANUI
TAHEKE
I
M
J
HAIRAKAU
RAUAWA
LEGEND
A Homestead: Coventry.
B Homestead: Sherwood.
C Employees' quarters.
D Woolshed, main yards, and dip.
E Water supply, Coventry.
F Water supply, Sherwood.
G Reserve of native bush.
H Stables.
I Stockyards and plantation.
J Stockyards and plantation.
K Plantation.
L Plantation and pampas grass.
M Plantation.
------ Pipeline.
● Supply tanks.



The men's quarters.

plantations on different parts of the station supply valuable shelter, but are also a source of timber for posts, gates, rails, and battens. Eucalyptus and prickly acacia are planted for timber, and shelter is provided by macrocarpas and pines. Messrs. Williams have provided valuable shelter and have ensured a ready source of maintenance timber for many years to come.

Pasture Management

Of the 200 acres of flat land, about 40 acres are used for horses, bulls, and milking cows. Usually 20 acres are put in rape and maize and the remaining 140 acres are available for grazing. Although cattle will fatten on almost any of the hill paddocks in the right condition, they gain considerably in weight if given two months on the flats. During the summer and autumn, therefore, the flats are used for this purpose. In addition, several paddocks are set aside for lamb fattening. Cattle cease to thrive on the flat land about the end of May or earlier if the weather is cold and wet, and provision is made for any bullocks not then fattened by shutting up six or eight weeks earlier a warm, sunny hill paddock where the bullocks will hold their condition or even improve until they can be disposed of. Thus in the provision of forage crops and hay and as a fattening ground the flats are an invaluable adjunct to the run.

The hill paddocks are usually grazed by big mobs for a short time, with long periods of recovery, so that with the stock being kept on the move the pastures are clean and fresh and growth is maintained.

Topdressing

Of the 3,800 acres of hill country, 600 acres of the more accessible paddocks have been topdressed with superphosphate at the rate of 2cwt. to the acre. None of the hill country has been topdressed since 1940, because the small amount of fertiliser available has been applied to the flats or on cropping land. That the pastures unquestionably respond to phosphates is evidenced by the sward in the topdressed paddocks compared with that of the non-topdressed.

Nearly all the flats have been well limed and show a marked response to the applications.

Grazing Management

Messrs. Williams's whole system of grazing management is aimed at successfully combating their most serious problem—facial eczema. In certain seasons the stud and breeding flocks suffered very heavy losses from this complaint. Some years ago officers of the Department of Agriculture and the Department of Scientific and Industrial Research drew attention to two methods which could be successfully employed to minimise the danger of attack—the use of (a) special perennial ryegrass-free pastures or fodder crops, and (b) mature feed. It was decided to evolve a management practice whereby special crops, pastures, and mature feed would be available during January, February, and March, the most dangerous months.

Breeding ewes being mustered.

Grazing practice may differ widely from year to year according to the seasonal conditions. The stocking of pastures is heavy or light according to the amount of growth. However, the common management practice is to endeavour to shut up part of the farm in the spring before growth ceases and hold it completely empty of stock until required.

When the property was first taken over it carried 7,500 sheep and 400 cattle. These numbers were maintained for three years to eat out and clean up the pastures thoroughly. In 1909 the sheep were reduced to 6,500 and the cattle increased to 800. For many years the normal stocking was 6,500 sheep (400 breeding ewes) and 900 cattle (150 breeding cows), and it was the practice to buy and fatten cattle rather than to breed extensively. In recent years this has become unprofitable and the breeding herd has been increased to 300. Cattle are bought for fattening only when it is warranted by a surplus of feed.

The present stocking figures are 6,000 sheep (3,800 breeding ewes) and 1,000 cattle (300 breeding cows). This balanced stocking undoubtedly benefits the pasture and results in a more economic fodder utilisation. The usual management practice is to put big mobs of sheep and cattle on a paddock to eat it out rapidly and then allow it a long recovery period.

It was found that this method had the following advantages:—

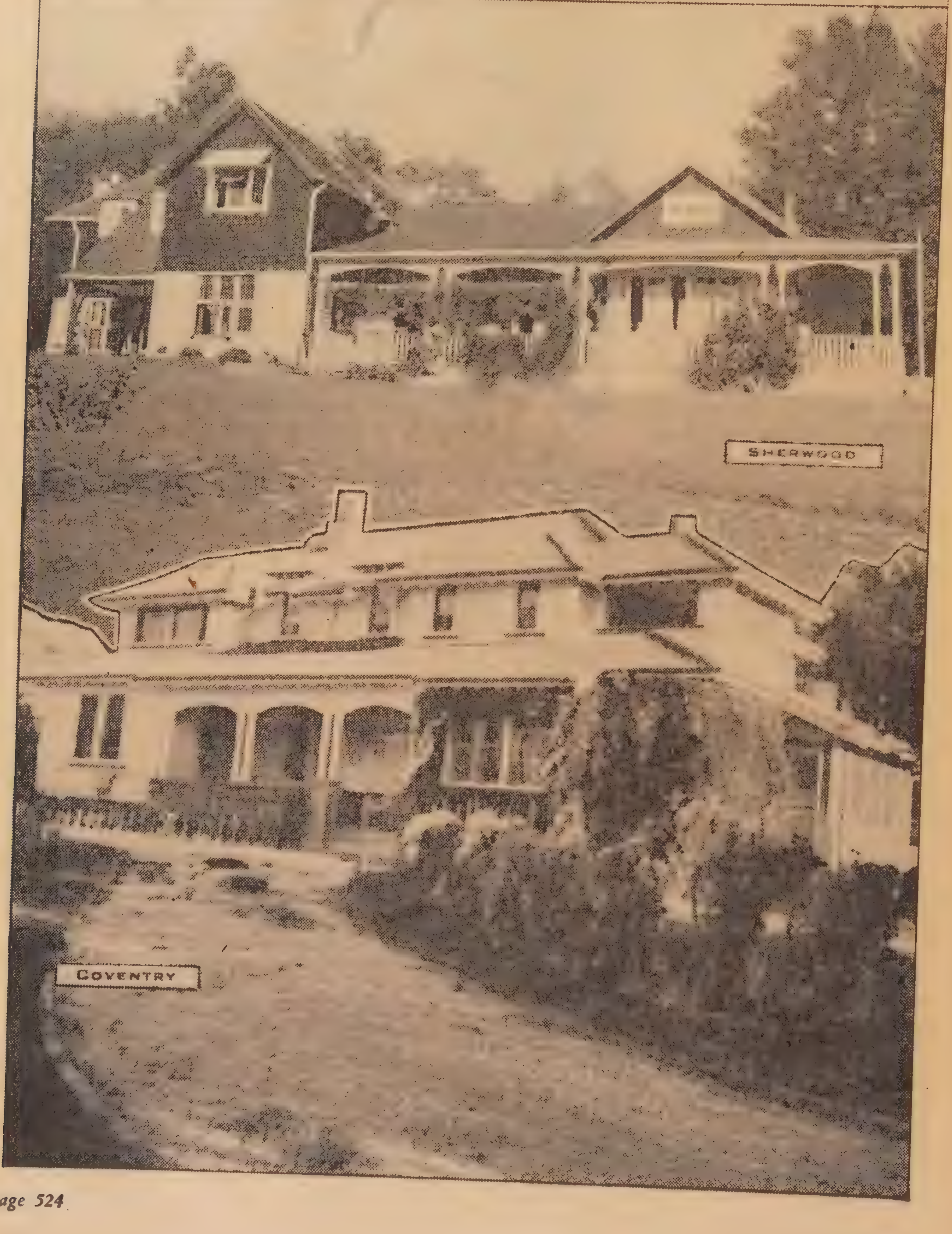
1. The paddocks are kept cleaner;
2. Preferential grazing is minimised;
3. A greater concentration and a more even spread of stock excrement is obtained;
4. It assists in the aim to have some paddocks carrying mature feed; and
5. It helps to reduce parasitic infestation, since the life cycle of the internal parasite is interrupted when its host leaves the paddock.

The carrying of 1 cattle beast to 4 acres has been of great value in keeping the country clean, and systematic grazing by cattle and a lessening of close grazing by sheep has resulted in a well-balanced sward.

No set programme of stocking is followed, and stock are used in numbers according to the size and condition of the paddock it is wished to graze. This may entail, say, the grazing of 10 sheep plus cattle to the acre for a week, or 5 to the acre for two or three weeks. The aim is always to eat out the paddock as quickly as possible to avoid damage to the better grasses or to the stock. Furthermore an attempt is made to vary the treatment of different paddocks from year to year, as it is never possible to give every paddock a good spell in any one season.

The actual stocking is at the rate (winter) of 1¼ ewes to the acre for most of the country and 1½ for the best paddocks, together with

THE HOMESTEADS


SHERWOOD
COVENTRY

about 1 grown cattle beast to 4 acres or one weaner to 3 acres, according to the amount of roughage available. The hogget paddocks are usually stocked at the rate of about 2½ to the acre for the winter.

Soil Erosion

Like a good number of hill-country station owners in the district, the Williams brothers have been faced with erosion problems. The marked reduction in sheep and the increase in cattle have greatly lessened the danger of the sward opening up. The maintenance of a thick, dense pasture and the consequent check of all but normal surface run-off have been the aim. Several erosion problems have been tackled by planting, making debris dams, etc., and many areas have either been completely stabilised or are under control. The remaining eroding areas are now being systematically controlled by plantings of willows and poplars. The trees have been planted in the form of a tripod—three saplings being tied together about 1ft. 6in. from the top. This method gives greater firmness and prevents stock barking the inside surfaces. Establishment in this manner without any other protection has proved very successful.

Supplementary Feed

The station is fortunate in having extensive alluvial flats which carry excellent pastures of ryegrass, white clover, Montgomery red clover, timothy, and prairie grass. An area of lucerne is always grown and, whenever possible, one or more paddocks are shut up for hay.

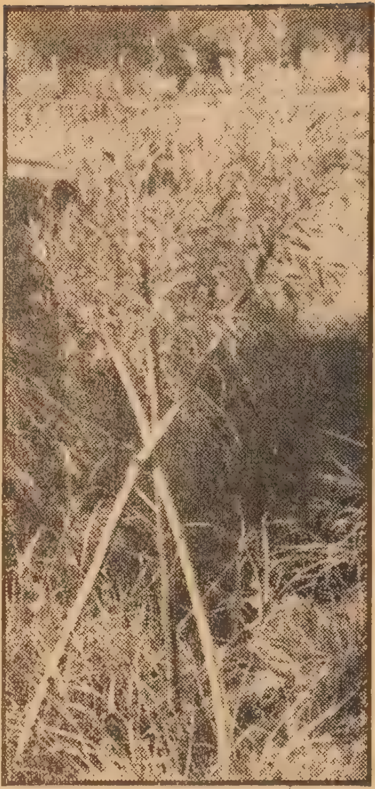
Every year 10 to 15 acres of rape are grown for fattening the lambs which do not come off fat from their mothers. Two paddocks sown with Pedigree white clover have been of considerable value this season for fattening stock. During the war 12 acres of maize were grown and the produce sold commercially. After being cropped with maize the land has been sown to permanent pasture.

Sheep Management

This season 6,000 sheep are being carried, of which 3,800 are Romney breeding ewes. All big sheep are shorn before November 20 to avoid seedy fleeces from bidi-bidi. The lambs are shorn between December 15 and December 25, and it is always found that part of the wool is seedy. After shearing, all sheep go back to the paddocks from where they were mustered.

All lambs are weaned immediately after they are shorn. The first cut of lambs is taken at the end of November and 60 to 70 per cent. go off their mothers to the works. The balance is fattened on rape and clover.

Dipping and culling: In January all sheep are dipped and culling commences; the breeding flock is culled down to 3,800, of which between 900 and 1,000 are 2-tooths. The mixed-age



Tripod willow planting, a method that Williams Brothers claim gives greater firmness and prevents stock barking the inside surfaces.

A typical valley on the property. Men's quarters and woolshed at left centre.

ewes are culled for wool and the inferior-woolled sheep, usually about 500, are put to Southdown rams for fat lambs. The ewes culled for wool are specially marked and are never allowed to return to the breeding flock. It is the practice to allow all 2-tooths that have been retained for breeding to run with 2- and 4-tooth Romney rams for a season, after which they are again culled for wool and the culls specially marked.

Tupping: Usually the rams are put in a small hill paddock, but for two or three weeks before being put out they are flushed on a good flat paddock and are specially fed on crushed oats and chaff. Before the rams go out the ewes are lightly crutched. The first rams are put out during the first week in March, but, as it is usual for the majority of ewes to come in season from about March 16 to March 20, only 1 ram to every 100 ewes is run for the first fortnight. The first rams out, which are not the most virile, are then removed and selected rams put out at the rate of 2 to 100 ewes. The rams remain with ewes until the end of April, and right up until the last fortnight any ram showing the least sign of weakness is removed and replaced. During this period the reserve rams are still specially fed.

Crutching: The main crutching is carried out in May, when all the breeding ewes are crutched and the 2-tooths are flanked to facilitate suckling.

Handling of In-lamb Ewes: About July 20 breeding ewes are mustered, handled. and divided into three mobs —(a) Those well in lamb and likely to lamb early; (b) Those a little backward and likely to lamb later; and (c) Those probably empty.

The ewes considered to be empty are stocked up to the rate of 2½ to 3 sheep to the acre and the in-lamb ewes are kept in their two classes and spread more thinly on the better pastures. Dividing the flock in this manner greatly assists lambing and docking.

Lambing: Lambing is very slow until about August 15 or 16, but the majority of ewes usually lamb before the end of August, and there is generally a lull until mid-September, when the final lambing takes place.

Docking and Marking: With this system of lambing, docking is spread out and it is found that normal labour is sufficient. Portable docking yards of hessian and hurdles are used and it is always the practice to dock lambs back into their own paddocks. This lessens upset and risk of mismothering. Precautions against infection are taken by the use of antiseptics throughout the entire docking process.

During docking a careful check is made for dry ewes and these are removed. All lambs are marked.

Drenching and Licks: In April and May lambs and hoggets are drenched, and stock lick is placed out in all paddocks.

The selected breeding ewes are handled in big mobs after culling, with the exception of those in low condition or suffering from foot-rot. Low-condition ewes are placed in good paddocks until their condition improves, and those with foot-rot are segregated and treated until cured. The cull ewes for sale are given the best available feed until fattened, and are disposed of during January and February. Lambs are classed for sex and condition, and forward wethers are put on rape or clover for finishing. The backward lambs of both sexes are given a good hill paddock.

In May all surplus sheep are disposed of, broken-mouthed ewes, 2-tooth wethers, and most of the wether lambs being fattened and sent to the works. The ewes are then drafted into their winter paddocks at about 1½ to the acre and remain there until they are mustered for lambing in August.

The flats are not used for lambing, but in the autumn they are used for topping off cattle that have been brought into forward condition on the hills. When the flats are closed to the cattle they are stocked with hoggets at 7 or 8 to the acre, after provision has been made for grazing for bulls and killers, and the growing of crops. The hoggets graze the small flat paddocks in rotation and when the strong, spring growth commences these

Pedigree white clover pasture.

Hereford-Shorthorn cross bullocks.

pastures are kept in order either with early-calving cows or dry cull cows for spring beef.

After docking, the hoggets go back to the hill country and the ewes with Southdown crossbred lambs are put on to the flats.

During the winter the flats carry only dry sheep, the balance, which cannot be accommodated on the flats, being put on the hills.

Nearly all Southdown crossbred lambs go to the works. Of the Romney wether lambs, 400 or 500 are usually left to be wintered; the balance of between 900 to 1,000 fatten either off their mothers or on rape or clover.

All old unsaleable ewes and 2-tooth wethers are fattened. No store or cull lambs are sold and no Romney ewe lambs are fattened for the export trade.

In 1905 the average clip of the big sheep (no lamb wool) was 7½lb. With reduced stocking it had increased to 9lb. in 1912 and today varies between 9 and 9½lb. according to the season.

Cattle Management

The cattle are a Shorthorn-Hereford cross-breed and the station runs 1,000 head, 300 of which are breeding cows. The Shorthorn bull is used for several seasons and then the Hereford. Thus an evenly-balanced cross is maintained without a dominance of either breed.

Culling: The breeding cows are culled early in November and any cows over 9 years of age, together with any of bad conformation, are taken out for fattening.

The bulls are put out in November and run with the cows until March, when they are returned to the flat pastures.

Calving: Calving usually commences in mid-August and continues until mid-December. As calving takes place the calved cows are mustered and the calves marked. The cows with calves are placed on better pastures and the dry cows kept separate.

Weaning: The calves are weaned in April and it is always the practice to put the calves into the paddock next to their mothers. It is found that both cows and calves fret less and the calves do not suffer to the same extent from the check.

Dehorning: During autumn all 18-month-old cattle are dehorned.

Fattening: Nearly all bullocks are sold fat as 3½-year-olds and no male cattle are ever sold as stores (a small lot was sold during the 1945 drought). The aim is to breed sufficient numbers to maintain a self-contained herd for normal seasons. If the season is one of abnormal growth, cattle are bought and fattened. No attempt is ever made to clean up country to a degree involving hardship to cattle. A certain amount of roughage is preferred as a standby for a severe winter or a droughty summer. In a normal season the 3½-year-old bullocks average 750lb. freezing weight. The only cattle sold as stores are 10 to 15 per cent. of cull heifers.

It has always been the object of the Williams brothers to use their cattle to obtain the most economic utilisation of fodder.

The properties support the following labour: 6 resident married men with families, including owners; 3 employees living off the station; and 1 single man. Two of the employees living off the station are semi-casuals.

Ideally-situated Homesteads

The two homesteads have tennis courts and are ideally situated in beautiful gardens of trees, shrubs, and flowers. Both homes are supplied with adequate spring water, and everything is planned for the comfort of the owners and their families.

Acknowledgments

Thanks are expressed to the Soil Survey Division of the Department of Scientific and Industrial Research for data in the soil map, to the Lands and Survey Department for the drawing of maps, and to Messrs. C. H. and H. C. Williams for their co-operation.

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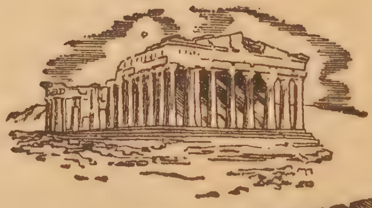

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A.1.10

Work for January in the Home Garden

By D. K. PRITCHARD, *Instructor in Vegetable Culture, Wellington*

"It is better to suffer wrong than to do it, and happier to be sometimes cheated than not to trust."

—Samuel Johnson.

THIS epigrammatical utterance may well be applied to gardeners, who are usually very tolerant and in most instances are prepared to accept full responsibility for crop failures. True, verbal explosions are sometimes heard about seeds or plants which have been bought from a seedsman or nurseryman. For his misfortunes, however, the average gardener is more inclined to blame himself than anyone else. What would appear obvious is the necessity for more investigation into cause and effect.

LOW viability of seed, disease which may be internally or externally seed borne, disease-infested soil, unsuitable soil composition, moisture content of soil, depth of soil coverage on seed, and care of the seed-bed after sowing are only a few of the many causes of germination results which may be disappointing, if not disastrous.

As far as seed-borne diseases are concerned, success or failure for every vegetable grower rests mainly in the hands of those who produce the seed. Production of high-quality seed is an undertaking of the highest value to the community, and its economic importance is fully realised by those engaged in the industry. Good seed is of the utmost importance, and seed should be obtained only from reputable seedsmen.

Disinfection by steam will do much to ensure successful propagation of seedlings, and the illustration on page 531 shows how a small quantity of soil may be efficiently and economically treated. When soil has been disinfected by steaming it is not advisable to use it for at least a week after treatment.

Vegetables for Late Autumn and Winter

In the November issue of the "Journal" the provision of vegetable supplies for late autumn and winter was briefly referred to. It is important that all plants considered necessary should be set out without further loss of time in the place where they are to grow until harvested. Seedlings already transplanted should be protected against attacks by aphides and caterpillars, which are very destructive pests during late summer and early autumn, particularly among green vegetables.

Paranaph is a highly efficient aphicide; the formula for making it has been published on several occasions in the "Journal." Nicotine sulphate may be used as a spray for both aphides and caterpillars. Where only caterpillars are present arsenate of lead can be used alone at the rate of 1¼ to 1½oz. to 4 gallons of water.

Paranaph may be applied during any part of the day, but nicotine sulphate will give best results if applied in warm, bright sunshine. Derris dust is also effective against aphis and caterpillars.

Shallots

As well-grown shallots should be harvested during late January or February, it is not advisable to continue watering the bed after December. High moisture content of the soil will not permit the bulbs to ripen properly, and continuation of growth after maturity is detrimental to the keeping quality of the bulbs.

Endive

In districts where lettuce are difficult to grow endive will prove a valuable substitute for use in salads. Seeds may be sown now and grown in much the same way as lettuce. Twelve inches between rows and the plants thinned out to a similar distance will give plenty of space for development.

Unlike lettuce, endive does not develop a solid heart. To blanch the centre of the plant, which is the part mostly used, the outside leaves should be tied together near the top.

Potatoes

The tops of main-crop potatoes should be examined regularly for late blight infection. Keeping the rows well moulded up protects developing tubers from the potato tuber moth, admits maximum sunshine between the rows, and provides better air movement among the plants, which materially assists in preventing the development of blight. However, spraying with freshly-made Bordeaux mixture is the best known means of protecting the crop against this disease, which takes a heavy toll of potatoes every year from the home gardener as well as the commercial grower.

Tomatoes

Fruit on tomato plants which were set out early should now be showing up well, particularly on the bottom truss.

In an endeavour to hasten ripening, leaves hanging over the fruit are sometimes removed; this is a mistaken idea and a practice which cannot be recommended.

When growth has developed until the foliage of plants set in the same row is meeting it may be advisable to remove leaves under the bottom truss of fruit. If that is done, air circulation round the base of the plants

[*Sparrow Industrial Pictures Ltd.*

Keeping rows of potatoes well moulded up protects developing tubers from the tuber moth.

Killing Meat On the Farm

The finer points of butchering are clearly dealt with in this bulletin, which discusses the most hygienic and efficient methods of killing for meat on the farm.

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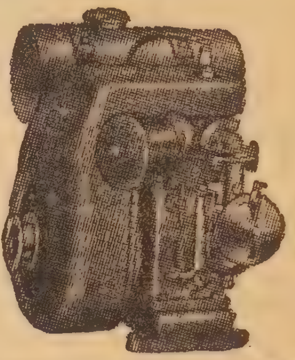

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will be better, hoeing for weed control will be easier, and the dry soil mulch created by subsequent working will assist in protecting the plants against attack by injurious fungi.

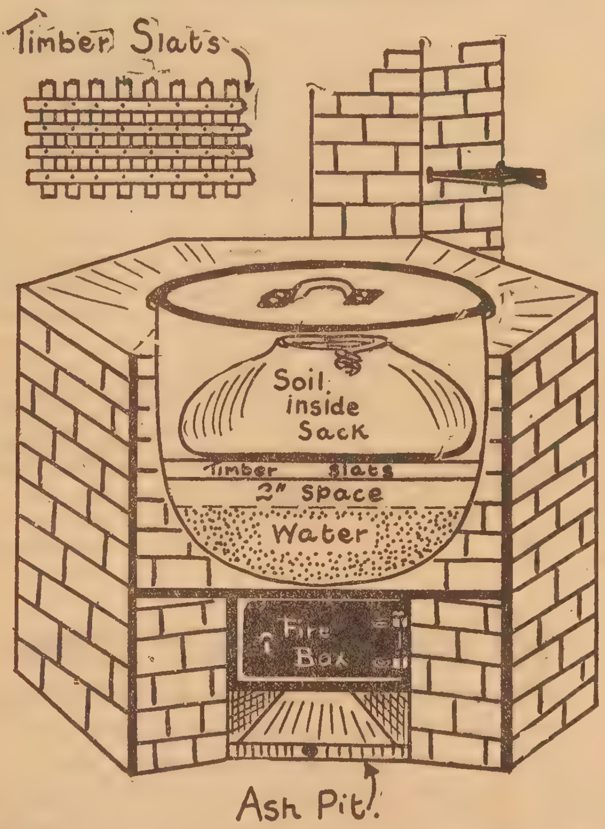
Pruning, too, should not be neglected. The growth of plants at this time is such that shoots not considered necessary for fruit production should be removed as soon as they are seen. During periods of high humidity dense foliage is almost certain to induce attacks of blight.

If plants become affected with late blight, no treatment at present known can restore them to their normal, healthy condition. Therefore, cultural practices to protect tomato plants from attacks of late blight should be adopted. Bordeaux mixture is still considered the most efficient spray for the protection of tomato plants from this disease; complete coverage of the foliage is essential.

Silver Beet

If silver beet is required for use during winter and spring, seed should be sown from mid- to late January, and earlier in southern districts. Giant Broad White Rib is the variety specially recommended. There are two strains of this variety, and the one which has dark green crinkled leaves is by far the more attractive.

METHOD OF STERILISING SOIL



SUFFICIENT plants for the home garden can be grown in a small seedling box, the seed being sown in rows 2in. apart. Disease-free soil is preferable, and the accompanying illustration indicates how a small quantity of soil may be efficiently and inexpensively sterilised. If leaf mould is not available, the necessary quantity of good black soil, free from lumps, should be obtained and mixed with one-third its bulk of clean, sharp sand (river sand is preferable). The total quantity should be about as much as would fill an apple case. Put water into the wash-house boiler until it is one-third full. Place timber slats across the boiler 2in. above the water and 2in. apart. Across these place more slats, laid in the opposite direction. The sack containing the soil should be tied loosely, placed on top of the slats, and spread out so that it will be in contact with as much as possible of the rising steam. With the lid on the boiler, the fire may be kindled and the water brought slowly to boiling point. This temperature should be maintained for an hour, after which no more firing will be necessary. The lid of the boiler should not be removed until the soil has cooled down to normal temperature.

Silver beet seedlings usually transplant well, but during February it is advisable to "puddle" them in and give a good watering after setting.

A spare corner of the garden with good rich soil is a suitable place to make the seed-bed. Better seedlings will be obtained if seed is sown in rows, and this method is strongly recommended.

Carrots

In carrot rust fly-infected areas seed for main crop carrots should be sown now. In the garden plan the place for the carrot bed should be as far as practicable from where this crop was grown during the past season. Even without rust fly infestation, strict crop rotation is desirable.

The seed should be given a little additional soil covering when sown during dry weather, but the topsoil must not be allowed to become dry or to form a crust through which the germinating seed will not be able to force its way. If the seed is fresh and germination good, it may be sown sparingly and subsequent thinnings used.

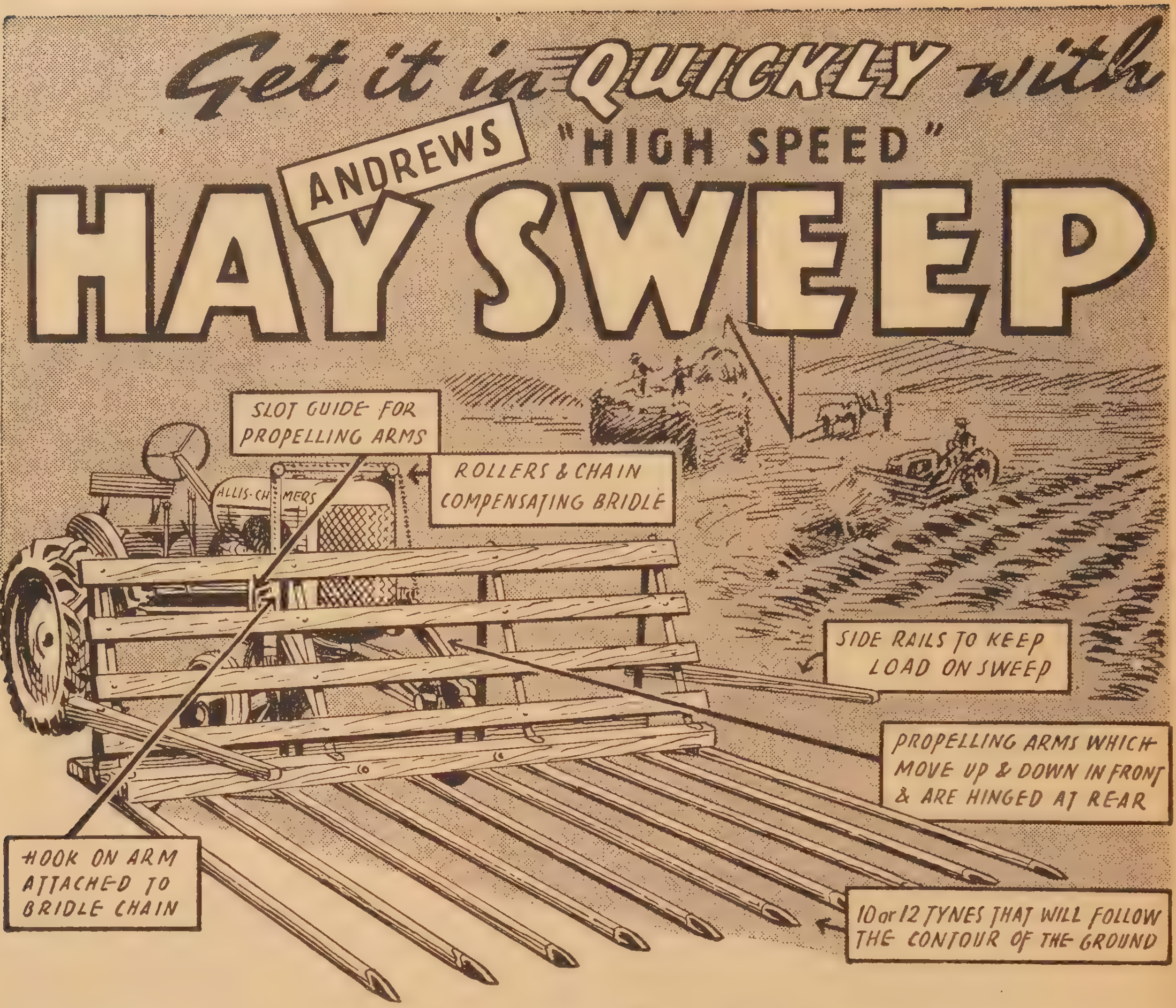
Market Garden, Earlykrop, and Chantenay are all good varieties, but Red-cored Chantenay is specially recommended. In the home garden greater row spacing than 12in. is unnecessary.

Lettuce

Where a succession of lettuce is desired, seed is best sown during January in the place where the plants are to grow to maturity. As lettuce seedlings do not transplant well in dry weather, the plants should be thinned when they are very young, the soil pressed firmly around those allowed to remain, and the whole bed given a thorough soaking with water. Regular shallow hoeing is necessary for weed control, and the bed should not be permitted to become dry. Tender, succulent lettuce plants cannot be grown in parched soil.

Beetroot

In many parts of the North Island beetroot can be grown successfully during all seasons, but in other localities care has to be exercised to obtain supplies for winter use. Turnip Rooted or Early Wonder (the latter stated to mature in 60 to 70 days) are varieties which, if sown during January, will produce good roots while the main crop is developing. They should be sown in rows 12in. apart, and the recommendation for greater soil coverage of carrot seed applies equally to seeds of beetroot.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Methods of Stacking Baled Hay

By K. A. SWINDELLS, *Assistant Fields Instructor, Whangarei.*

WITH the double incentives of a serious world food shortage and the disastrous effects of last season's drought on primary production in this country, all farmers must make sure that they do all in their power to prevent stock going hungry next winter. During this season not only must more supplementary food be saved, but losses and waste of good foodstuffs must be avoided. By efficient harvesting, baling, and stacking of hay farmers can assist themselves and further the drive for increased production.

HAY is one of the most convenient of supplementary stock foods. It is produced from raw material present on the farm; in favourable weather it is easy to make; when pressed into bales it is simple to feed out, and it will keep for several seasons. Though haymaking is a somewhat wasteful method of conserving grass, hay is a major constituent of the Dominion's supplementary foods, and a surplus is an asset to any farm, as the experience of this year's drought has shown.

Practice has taught farmers a lot about the making of hay, and with favourable weather and the information now available there is no excuse for making an inferior product. Well-managed pastures containing a dominance of species of the highest nutritive value, if cut for hay at the early flowering stage and carefully cured without being baked in the sun or allowed to become sodden, will produce the best hay.

Hay to be baled requires just as much attention in the making and curing as hay to be stacked loose. With lucerne hay or hay with a high clover content proper curing before baling is even more essential. If the weather is settled, it is advisable where a pick-up press is used to leave the bales in the paddock for a day in small stacks or stooks of four bales, placed on end and leaning together at the top. More thorough drying out occurs, thus ensuring that the stack does not heat or become mouldy.

Advantages of Baling

Every year large quantities of hay are spoiled by bad stacking or careless covering. Baling, together with reasonable precautions in storing, will reduce this loss to a minimum and ensure better feeding and more accurate rationing. The hay is more convenient to handle or store, and the task of feeding out during the winter is made lighter. Any increase in harvesting costs may be offset by the advantages obtained.

The stacking of loose hay is an art; a skilled person is needed to ensure that the job is done well. When stacking baled hay the necessity for good work is often given insufficient consideration, and unsuspected difficulties are encountered. These can be avoided by a little extra care and time spent in methodical building.

It cannot be too strongly emphasised that extreme care is necessary when pressing hay. The even feeding of hay into the press and the turning out of bales of equal length ensure that as far as is practicable all bales are of fairly even compactness. A solid or neat

DETAILS OF A RECTANGULAR STACK

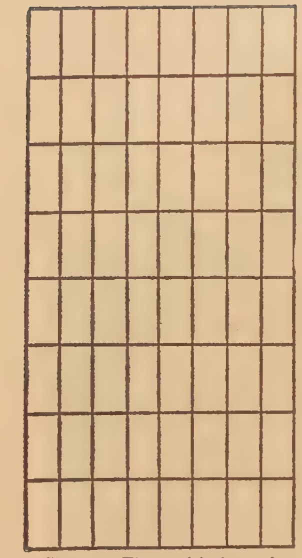

Fig. 1—First, third, and seventh layers.

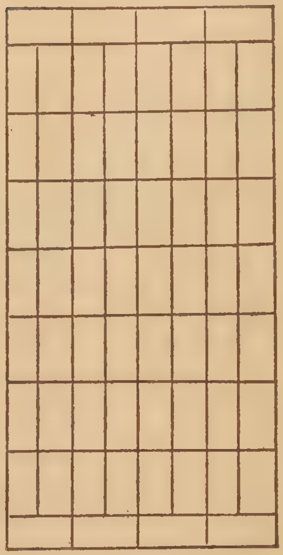

Fig. 2 — Second and sixth layers.

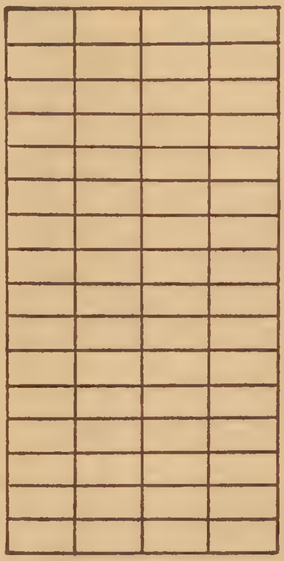

Fig. 3—Fourth layer.

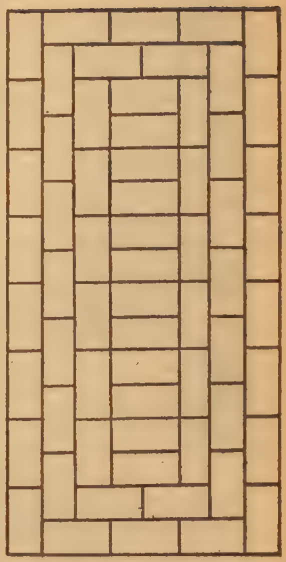

Fig. 4—Fifth layer.

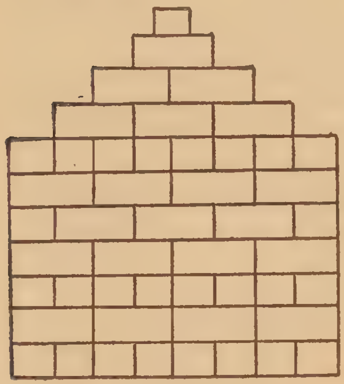

Fig. 5—Perpendicular end view of rectangular stack.

RECTANGULAR STACK: The capacity of this stack is 552 bales or about 16 tons. The base is the length of 8 bales long by the width of 8 bales wide. The first 7 layers are placed to knit the stack together in the same manner as for a square stack. The first, third, and seventh layers are built as shown in Fig. 1, the second and sixth layers as shown in Fig. 2, the fourth layer as shown in Fig 3, and the fifth layer as shown in Fig. 4. The roof is built in the same manner as for a square stack (see next page), with perpendicular ends (Fig. 5).

DETAILS OF NARROW RECTANGULAR STACK SHOWING ALTERNATIVE METHODS OF CAPPING

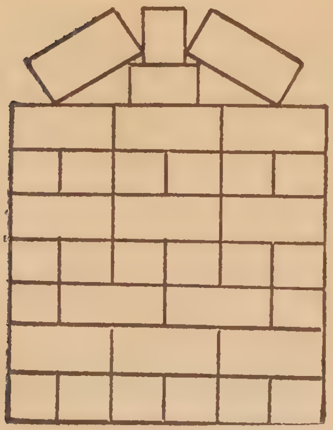

Fig. 6.

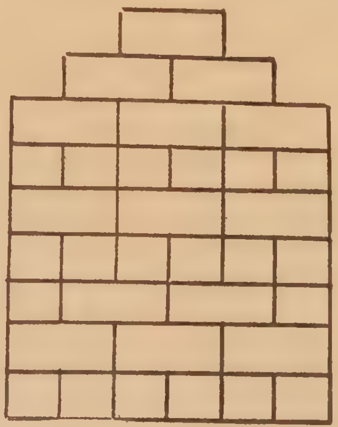

Fig. 7.

NARROW RECTANGULAR STACK: This is a modification of the rectangular stack, only 3 bales wide, which has proved satisfactory in practice. The length depends on the amount of material to be stacked. To ensure that the stack does not fall over the height should not exceed 7 tiers. The roof can be finished off by one of two methods. The first is by placing single bales wide side downward along the middle of the stack, placing another row of single bales on their narrow sides down the centre of this strip, and finally placing bales in the same manner as the rafters of a roof (Fig. 6). The other and simpler method is illustrated in Fig. 7.

DIAGRAMMATIC DETAILS OF THE BUILDING OF A SQUARE STACK

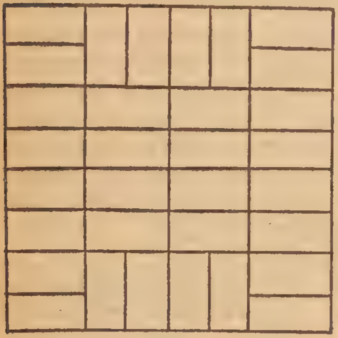

Fig. 8—First and fourth layers.

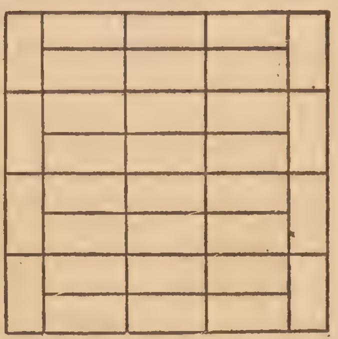

Fig. 9—Second and fifth layers.

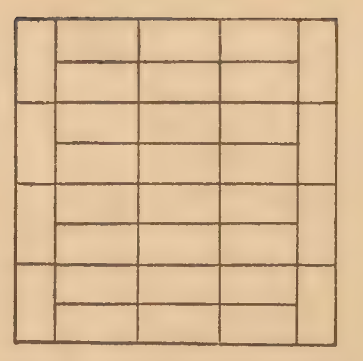

Fig. 10—Third and sixth layers.

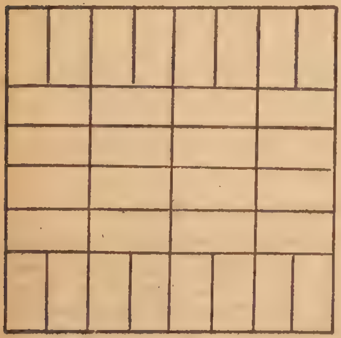

Fig. 11—Seventh layer.

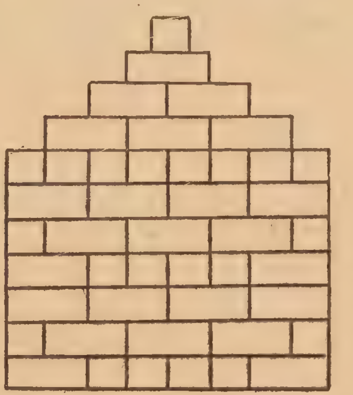

Fig. 12—Perpendicular side view of square stack.

SQUARE STACK: Following is a description of a stack built the square of 4 bales long, to hold 276 bales or about 9 tons. The bales of the first layer, 32 in all, are placed with their ends to the outside (Fig. 8). The next layer is built to lock the first one (Fig. 9), and the third layer to lock the second (Fig. 10). The fourth, fifth, and sixth layers are built to the same plan as the first, second, and third respectively. The seventh or last complete layer (Fig. 11) covers the gaps in and secures the sixth layer. The roof is built in 4 tiers and has perpendicular ends (Fig. 12). The bales of the first 3 tiers are placed with their long edges adjacent, each layer locking the previous one in place. To complete the stack 4 bales are placed end to end down the middle.

stack cannot be built from bales of irregular length, and loose bales will collapse under the stack's weight.

Site and Foundation

A level, well-drained site, sheltered from the prevailing wind, is preferable for the stack. By avoiding a site which permits the creation of muddy conditions round the stack the work of feeding out will be made easier.

To avoid building directly on the ground a good base of logs laid down with a level surface enables the first layer of bales to be built to form a firm foundation for the remainder of the stack. If no logs are available, use the next best material—old hay, broken branches, or even pieces of scrap iron. By keeping the hay off the ground the bottom bales are prevented from becoming mouldy and the baling wire from rusting, both of which occur from contact with damp soil. Furthermore, the resulting air space will allow a draught under the hay, preventing overheating and thus keeping the bottom bales sound.

If the stack is to be rectangular, lay out the site so that the end of the stack faces the prevailing wind.

Size and Shape

The size of the stack to be built can be calculated from the fact that 1 ton of hay in bales occupies about 250 cubic feet, depending on the material from which it is made. Taking 1½ tons an acre as an average yield, an 8-acre paddock would produce 12 tons of hay, requiring a stack approximately 12ft. wide, 21ft. long, and 12ft. high. The size of stack required for any paddock can be calculated by a modification of these figures, remembering that they are approximate and will vary with local conditions.

Only rectangular or square stacks are possible. A square stack is suitable when the number of bales is limited, but a rectangular stack gives better results when storing large quantities of hay.

Building the Stack

Before starting it is advisable to plan the type of stack and the details of placing the bales in the stack. Certain general rules apply. No matter what final shape the stack is to be, each layer should be built so that it locks the preceding layer of bales into place to ensure solidarity.

Where possible and consistent with building a secure stack, place the ends of the bales to the outside; the ends let in least water. If all bales are placed with their flat sides down, a better run-off of rain water, less exposure of wires or twine, and more efficient stacking are obtained. Solid, even-sized bales in the bottom layer ensure a solid foundation for the rest of the stack.

As building proceeds keep a constant watch to see that the walls are closely interlocked and perpendicular. Internal air spaces are provided by taking advantage of irregularities in the sizes and shapes of the bales. This ventilation will lessen chances of the stack heating unduly or perhaps catching fire.

Loader Attachment for Baler

When a stationary baler is being used much heavy lifting can be saved by the use of a chute to transfer the bales from the baler to a nearby stack or lorry. This device, working in a somewhat similar manner to a conveyor or elevator, relies on each bale as it comes out of the press forcing the preceding bales along the chute in a continuous line.

It is made about 18ft. long, with sides 8in. high, and is hinged to the bottom of the press so that as the stack grows higher it can be lifted up another layer, to a height of 8 bales. As the boards used in the press travel with the bales up the loader to the stack, a number of extra division boards will be needed when using the loader.

Topping and Covering

The first essential in topping the stack is to cover the roof of bales with a high capping of loose hay. Build the hay so that it will turn the water. If difficulty is experienced in keeping the hay in place, peg it down. This layer should be made secure and covered by one of the following methods, depending on the materials available:—

1. **Sacking:** A sack cover can be made by cutting open manure sacks and sewing them together. It should be placed on the stack so that most of the loose hay is covered and carefully weighted to prevent the wind from lifting it off or tearing it. A sack cover will last longer if thoroughly soaked in a 1 per cent. bluestone solution.

2. **Wire Netting:** Strips of wire netting, wired together and weighted down, passing over the apex of the roof and covering the loose hay topping make a satisfactory finish. The netting has a thatching effect, holding the loose hay in place and pressing it together to form a waterproof layer.

3. **Corrugated Iron:** Covering with corrugated iron, if sufficient is available, is another way of keeping water out of a stack. Various methods are adopted, but it is essential to ensure that a water-shedding cover is made; that ventilation is left between the top of the hay and the under surface of the cover to prevent sweating and rusting of the iron; and, above all, that it is securely fastened and weighted down to obviate lifting by strong winds. A simple way of using corrugated iron is to leave the top of the stack flat. The iron is nailed to lengths of 3in. by 2in. wood to keep it in place, and the cover weighted. A waterproof, lean-to roof is thus made, fall being provided by placing an extra layer of bales to raise one edge of the iron.

4. **Thatching:** Thatching is most satisfactory for a very steep roof, and the pegs used will help to keep the hay capping in place. It is a painstaking job, but if the materials are handy on the farm, and the work is done properly, it is worth the trouble.

Shed or Barn Best

Though efficient stacking and covering of baled hay are necessary, no method of storing is better than stacking it in a shed or barn. Sheds erected at convenient places on the farm are not only a great asset but offer the ideal way to stack and store baled hay.

PREPARING LAND FOR AUTUMN - SOWN PASTURE

By E. B. GLANVILLE, *Assistant Fields Superintendent, Auckland.*

ON practically all farms thought will now be given to the preparation of areas which are to be regrassed to permanent pasture during the coming autumn. It is important that this work be started immediately, as unsuccessful establishment of good pastures is often traced to hasty seed-bed preparation. The aim should be to have the bed clean, sweet, moist, fine, and firm at the time of sowing. Cultivation should be completed early to enable the seed to be sown while the land is still warm and in good condition.

SUCCESSFUL early establishment of a palatable, close pasture sward depends on the quick establishment of white clover. This cannot be achieved unless a well-prepared, firm seed-bed is provided. White clover seed will not give a good strike if sown on a rough, loosely-prepared bed, and ryegrass will not thrive in the sward unless accompanied by white clover.

Late cultivation is often caused by waiting for a crop to be fed off, and consequently the preparation of the desired bed for grass seed is difficult to obtain. The sowing is then delayed until very late autumn, when heavy rains have usually fallen. As a result many of the young grass and clover plants fail to survive the wet, cold, and frosty conditions of the following winter.

Early ploughing, including a summer fallow—particularly when bringing in virgin land—during which the furrow slices are worked down with disc and tine harrows, will permit a suitable seed-bed to be prepared in time for sowing in late February or early March. Fineness throughout the depth of the seed-bed is most important. A fine surface with large clods of earth beneath does not constitute a good seed-bed, and this type results from hasty, late preparation.

Natural Consolidation Best

Natural consolidation or firmness such as can be obtained by summer fallowing is much superior to that attained with any farm implement. Forced consolidation with implements produces a seed-bed which is firm on top but loose below. On light land the use of a roller is essential even with a summer fallow, and the furrow slices should be rolled down in the same direction as the ploughing before cultivation is begun with top-working implements such as disc harrows.

Though cultivation methods must vary in different districts because of the variation in soil types and climate, the objective in preparing land for sowing permanent pasture is the same: To do everything possible to prepare a seed-bed which is clean, sweet, moist, fine, and firm from bottom to top.

The main work in preparing the seed-bed should be completed by the end of January, and during February periodic harrowing with tine harrows should be carried out to firm the soil and kill young weed seedlings. Final harrowing and rolling should take place early in March before the grass seed mixture is sown, and if the land is light, it should be rolled again after sowing.

Regrassing after Rape

Where it is intended to regrass in the autumn after a crop such as rape which has been used for fattening lambs, the rape stubble should be grazed as short as possible by grown sheep. A satisfactory seed-bed can then be obtained simply by discing and harrowing the area before sowing, and following the sowing with rolling. This method will allow the grass seed to be sown during March on a reasonably-consolidated bed, but a certain amount of second-growth rape will occur. This is considered a better practice than ploughing rape stubble before sowing, because the time taken to plough, together with subsequent cultivation, will result in late sowing on an unconsolidated seed-bed and poorer pasture establishment. Also, with surface cultivation the pasture will benefit by the manure in the surface soil left by the grazing stock.

Difficulty is often experienced in districts where the autumn regrassing of areas which have been in cereal crops is desired. If possible, autumn regrassing after cereals should be avoided, as sowing is usually unavoidably late, and after a cereal crop the soil, especally in arable districts, may not be fit for the establishment of a good pasture sward. The soil is often too dry to be ploughed and worked down satisfactorily, and the fertility is often low—conditions which do not allow of a firm seed-bed. These conditions result in poor germination of grasses and clover, which will give a poor, weak, open pasture sward.

FARMING IN NEW ZEALAND

Subsistence Farming

THE farming industries of New Zealand are in very much the same position today as they were in 1939, but some re-organisation of production methods may be necessary to meet the demands of post-war markets. It may be interesting, therefore, to look back on the history of New Zealand farming and consider the changes in farm management and production which have occurred and the men who saw in advance the changes which were necessary. This article by P. W. Smallfield, Director of the Rural Development Division, is the first of a series dealing with farmers who were most concerned with the adoption of improved farm management practices.

NEW ZEALAND farming owes a great deal to the men who first conceived the ideas on which present farm management systems are based. Some improvements have been the work of an individual; others are the result of the gradual evolution of the ideas and experiments of many men. The names of some of the improvers are known, but the work of others equally important has been left unrecorded. The names of most of the pastoralists who pioneered the sheep industry are known, but less is known of the Highland shepherds who devised the methods of extensive flock management. Likewise the men who perfected the milking machine are better known than the dairy farmers who worked out the details of the walk-through shed. Known or unknown, their work remains, and it is the purpose of this series of articles to define the main farm management developments of the past and wherever possible to relate the changes to the men chiefly concerned in their adoption.

Changes in Farm Management

The main changes in farm management methods in New Zealand may be divided into five periods, which overlapped to a certain extent and varied considerably from district to district in time and method of adoption.

Naturally the pioneer settlers were concerned with subsistence farming. They had to live and, as transport facilities were poor, they often had to process as well as grow their own food crops. In northern districts the production of timber and kauri gum often provided additional income, and in many isolated settlements a modified type of subsistence farming existed up to the close of the nineteeth century.

The next period covers the development of extensive pastoral farming on the tussock grasslands of the South Island, which provided ever-increasing quantities of wool for export and in return allowed the import of manufactured goods which were so necessary in the early development of the country.

Following the gold discoveries in the sixties and consequent increase in population, farmers in the South Island extended cereal production and later modified management to arable mixed farming with the advent of the meat export industry.

The last two decades of the nineteenth century marked the rapid extension of pastoral farming to the North Island on grasslands sown after bush and scrub fires. They also mark the development of the meat export industry, while the twentieth century has witnessed the development of the dairy industry and the continued expansion of meat production.

It was in the nineties that the real foundations of intensive pastoral farming were laid, when far-seeing men demonstrated and advocated the principles of intensive grassland farming. They saw that closer settlement was necessary for the future prosperity of the country and that farming should be based on meat and milk production; they demonstrated the usefulness of lime, fertilisers, and annual crops for supplementary feeding as essential parts of the programme for the improvement of pasture production and livestock feeding.

Finally, the past three decades of the twentieth century have witnessed the adoption of mechanisation in farming and the further development of farm management practices based on really intensively-managed pastures. In this period the problems of pasture depletion and deterioration, reversion to secondary growth, and sheet and slip erosion have become serious over very large areas of pastoral country. They are the problems which must be faced in the immediate future, and reclamation work must be carried out so that hill-country pastoral farming may be stabilised.

Early Settlement Policies

There is nothing very remarkable in the pioneer farmers of New Zealand adopting subsistence farming. They had no choice. There are, however, certain features of the work of the advocates of ordered and progressive settlement based on farming with villages as the social and business centres which are worthy of attention. Many of the leaders were men of character and culture; they carried out their work under difficulties and hazards that would have daunted lesser men, and the results of their work are still apparent in many parts of the countryside—in people and place names, houses and trees, and towns and villages. They visualised a country

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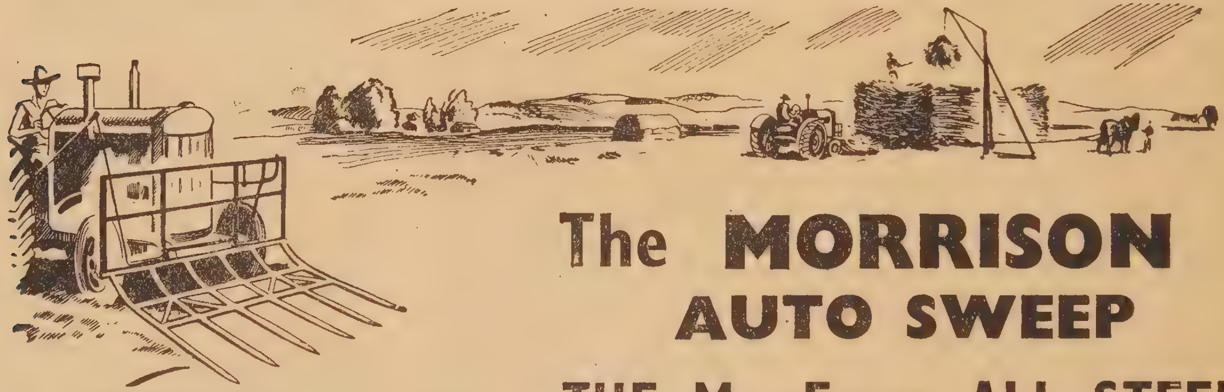

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of small farms and villages on the pattern of rural England. Natural and economic conditions precluded the immediate fulfilment of their plans, for the pastoral age was a necessary preliminary to the development of the country, and later trends in forming the pattern of rural settlement have been greatly influenced by modern transport methods and other factors of the mechanical age. The villages generally have either grown or are growing into towns or declining as business and social centres, and the pattern of farming has been determined not by the domestic needs of the country but by the demands of the United Kingdom market.

It may help in placing a proper value on the present pattern of the countryside and in appreciating population movements if brief consideration is given of what the early colonisers had in mind as the pattern of settlement and why many of their plans went astray.

In the early colonisation of New Zealand there were three farm parties or policies: the policy of the Church missionary societies; the policy of the New Zealand Company and subsequent associations; and finally the policy of the actual settlers who were concerned with making a living and whose interests frequently conflicted with those of the other parties.

The Church missionary societies visualised the maintenance of Maori communities farming their own tribal lands and somewhat segregated from the European settlers, so that (under missionary guidance) they might gradually develop religion, learning, and industry.

The policy of the New Zealand Company and its subsidiary associations aimed at a system of colonisation based on transplanting a complete cross-section of the British people comprising farmers and labourers, artisans and domestics, parsons and school teachers, and professional and business men so that the settlers could quickly re-establish in New Zealand a society similar to that of the Homeland. The main points of Wakefield's theory of the art of colonisation on which the policy of the New Zealand Company was based were that colonisation should be systematic; that settlement should be concentrated; that the price of land should be fixed, uniform, and "sufficient;" that land revenue should be spent on immigration and public works, and that pastoral leases should be short and pastoral lands open for free selection.

The settlers wanted land with a clear title and freedom to develop their farms along the lines they thought best. At first their requirements conflicted with those of the Central Government (and of the Government's missionary advisers) and later, when pastoral farming gave promise of easy success, with the original land policies of the South Island settlement association.

Maori Farming

The early traders, missionaries, and indeed the early settlers relied largely on crops raised by the Maoris for their food supplies, for the Maoris of early New Zealand were skilled cultivators of food crops. They understood soil management, drained wet soils, improved the texture of heavy soils by adding sand, sheltered their plantations from winds, and fertilised the soil with wood ashes. Migrating from the warm islands of eastern Polynesia they found that only a few of the food plants they brought with them would grow, and these only in the warmer districts of the North Island. The four most important crops grown were the kumara, yam, taro, and gourd. Originally their food supplies had to be supplemented by natural products from the forest, stream, and sea, but a great advancement in the provision of food supplies was made when Captain Cook and other early voyagers introduced pigs, potatoes, maize, and wheat, together with iron hoes and spades.

The Rev. Samuel Marsden.

Pork, potatoes, and hand-dressed flax became important items of trade early in the 19th century and were exchanged with whalers and traders for muskets, powder, hoes, spades, axes, and fish hooks.

The early missionary settlers, while they relied largely on the Maoris for food, developed the range of crops grown, and it was the missionaries who established the first farm in New Zealand.

The Rev. Samuel Marsden

The Rev. Samuel Marsden was really the pioneer of European farming in New Zealand, although he visited the country only at infrequent intervals. Marsden was the driving force behind the activities of the settlers and clergy of the Church Missionary Society. In addition to his work as a chaplain and missionary, he was a prominent farmer at Parramatta, New South Wales. He was no mere talker and writer on farming, but a noted breeder of sheep and was well versed in practical agriculture. He saw that the Maori was a practical man with a strong commercial bias, and that the introduction of religion and learning must be accompanied by industry.

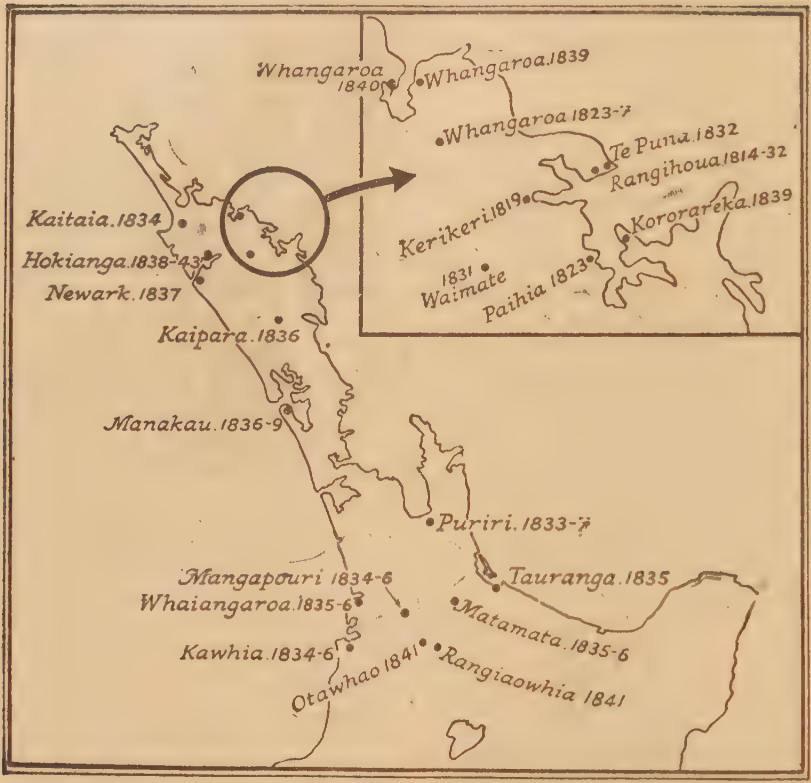
His aims in farming and industry were to make the missions self-sufficient in food production and to encourage the Maoris to adopt European farming methods and crafts. He had a difficult task, for many of the missionary settlers, artisans, and clergy were neither interested nor experienced in farming. He had frequently to admonish the missionaries on their inability to provide self-sufficiency in food and the consequent expense to the society of importing flour and providing goods for the bartering of pork and potatoes from the Maoris, and on their careless treatment and destruction of the livestock he had supplied.

Marsden's constant urge to the mission stations was that they should extend their relatively small gardens into regular farming operations, use the plough, sow cereals and pastures, and practise mixed farming, with particular attention to livestock. The historic plough with which the Rev. Mr. Butler turned the first furrow in New Zealand at Keri Keri in May, 1820, had lain unused for several years until Marsden, during his visit to New Zealand in H.M.S. Dromedary, arranged for the loan to the mission station of the bullocks brought over and used by the ship's company for timber haulage.

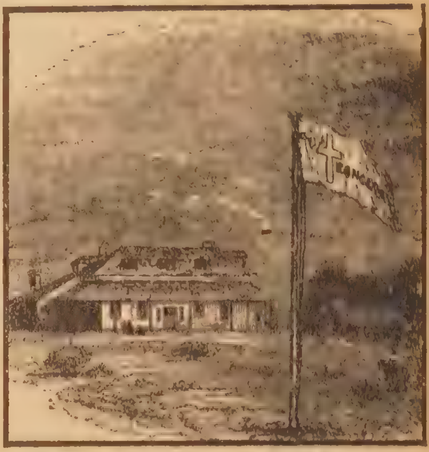
Concerning cattle and the mission stations, Marsden reported as follows to the Church Missionary Society in March, 1821:—

> "A moment's reflection ought to be sufficient to convince the most ignorant of the vast importance of cattle in a new country for labour, milk, butter and animal food, etc. Had the missionaries only attended to the cattle that have been imported they would not now be in want of animal food . . . At one time I sent over six heifers—very fine ones. They informed me they wanted a bull. I then sent over two very fine English bulls. They neglected to put these to the heifers, so they never bred. When I returned in the Dromedary I took over more cattle with me. On my arrival I found the Rev. Mr. Butler had shot one of my heifers and two bulls, and also one cow in

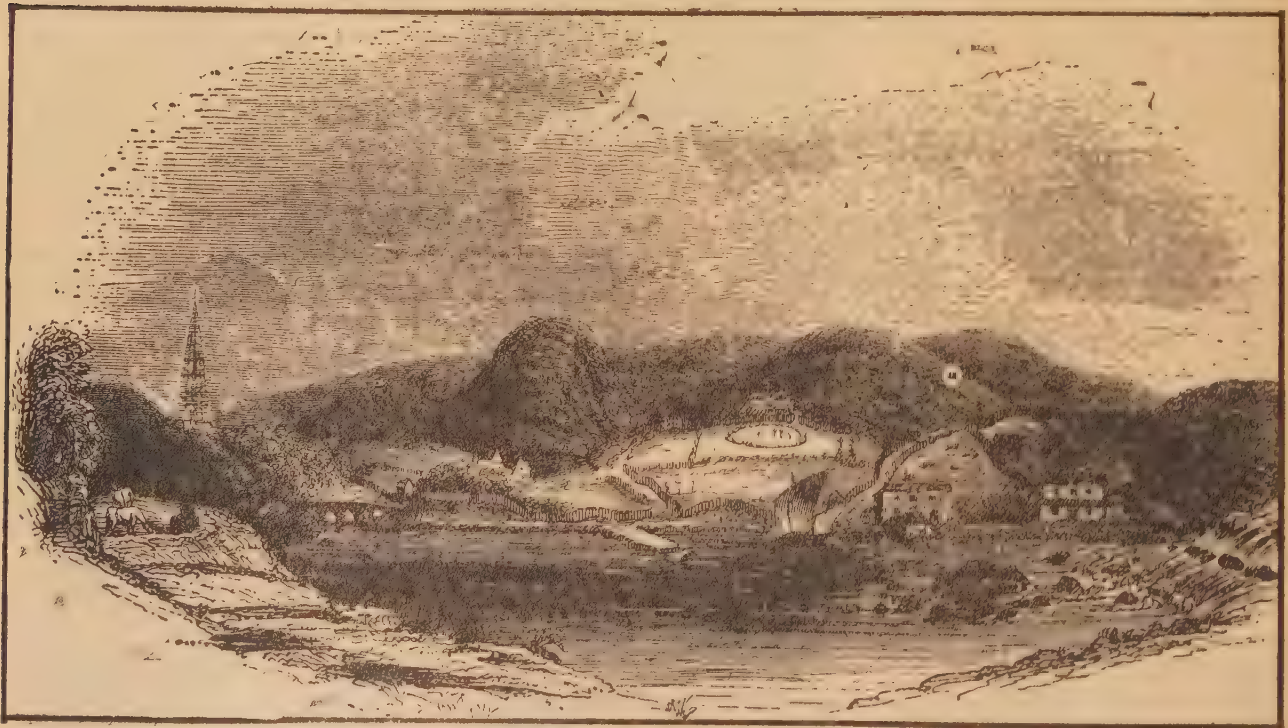
Mission Stations


Whangaroa 1840
Whangaroa.1839
Whangaroa 1823-7
Te Puna.1832
Rangihoua.1814-32
Kerikeri.1819
Kororareka.1839
1831 Waimate
Paihia 1823
Kaitaia.1834
Hokianga.1838-43
Newark.1837
Kaipara.1836
Manakau.1836-9
Puriri.1833-7
Mangapouri 1834-6
Tauranga.1835
Whaiangaroa.1835-6
Matamata.1835-6
Kawhia.1834-6
Otawhao 1841
Rangiaowhia 1841

Flour mill at Waimate.



The mission house at Waimate.



The mission station at Keri Keri.

> calf. When I asked him his reason for doing so, he said he wanted to get them into the settlement and finding he could not, he shot five of them and Shunghee* shot one. I was much hurt at this circumstance, as it was defeating my intention toward New Zealand. Mr. Butler had no right to kill my cattle: it was a wanton, thoughtless act. The cattle could not have been worth much less than £100 in New South Wales. They had cost me considerable trouble and expense to get them into the country. Their beef was very fat. Had they acted properly from the first, they would have had plenty of milk and butter and a considerable quantity of beef by this time, and would not have been so dependent upon the Natives. If the society could meet with a pious farmer, or if a few families were settled on the society's land, this would be an excellent thing . . . Some measure must be adopted to render the missionaries independent of the Natives, and there is none but agriculture that can furnish them with supplies."

In the end Marsden's farming plans achieved temporary success at the Waimate and Rangiaowhia Stations, only to be submerged by the disastrous Northern and Waikato wars.

Farming at Mission Stations

Between 1814 and 1840 the Church Missionary Society established stations through most of the Auckland Province and in Poverty Bay (see map on opposite page). The Wesleyans were for a time at Whangaroa and the Roman Catholic Church established stations at Hokianga, Bay of Islands, and later at Whangaroa. The first stations of the Church Missionary Society were centred at the Bay of Islands—at Rangihoua, Keri Keri, and Paihia.

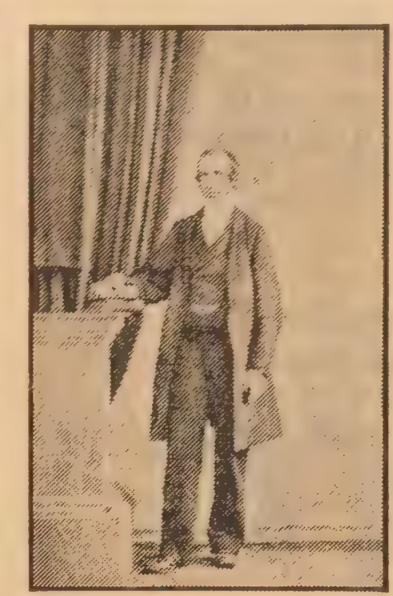
Farming operations were mainly confined to gardening and the production of small areas of wheat. Keri Keri was intended to be the main farming centre, but the land was not suitable; much of the 13,000 acres originally purchased for the station is inferior ironstone soil and still remains an unproductive waste. The missions relied largely on the Maoris for food, and spades, axes, hoes, etc., were bartered for potatoes and pork.

In 1829 the missionaries decided to move their farming operations to Waimate, nine miles inland from Keri Keri, where 250 acres of fertile volcanic land were purchased. By 1840 farming operations, under the direction of Mr. R. Davis, were in a satisfactory condition. A hundred acres, 80 acres of which had been fenced, had been sown in grass; 25 acres were in wheat; gardens and orchards occupied a smaller area, and 200 sheep were carried as well as the milking cows and draught cattle of the station. A flour mill had been installed which in the past year had ground 48,000lb. of flour for the station as well as considerable quantities for the Maori farmers. The station had its own blacksmithing and building artisans and was established to fulfil the aims of the society in self-sufficiency in food and for the instruction of the Maoris.

The development of Waimate into a successful farm was due largely to Mr. Davis. A Dorsetshire tenant farmer and a man of strong religious sentiments, he was tireless in his efforts to help the Maoris to improve their farming methods. Charles Darwin, who visited Waimate in 1835, wrote:—

> "At length we reach Waimate. After having passed over so many miles of an uninhabited, useless country, the sudden appearance of an English farmhouse, and its well-dressed fields, placed there as if by an enchanter's wand, was exceedingly pleasant . . . On an adjoining slope fine crops of barley and wheat standing in full ear; and in another part fields of potatoes and clover. But I cannot attempt to describe all I saw; there were large gardens, with every fruit and vegetable which England produces; and many belonging to a warmer clime. I may instance asparagus, kidney beans, cucumbers, rhubarb, apples, pears, figs, peaches, apricots, grapes, olives, gooseberries, currants, hops, gorse for fences and English oaks, also many kinds of flowers. Around the farmyard there were stables, a threshing barn with its winnowing machine, a blacksmith's forge, and on the ground ploughshares and other tools; in the middle was that happy mixture of pigs and poultry lying comfortably together, as in every English farmyard. At the distance of a few hundred yards, where the water of a little rill had been dammed up into a pond, there was a large and substantial water mill."

The Rev. Richard Davis.



The Rev. John Morgan.

The work and influence of the Waimate Station were upset by Heke's war, and the land and buildings were taken over in 1842 by the Church of England; it was there that Bishop Selwyn established his headquarters and opened the College of St. John which was moved to Auckland in 1844.

It was, however, in the Waikato that missionary and Maori farming really progressed and assumed considerable importance in the early fifties. A mission station was established at Te Awamutu in 1839, but no progress was made in farming operations until 1841, when the Rev. John Morgan took over the mission. He taught the Maoris to grow wheat, grind it in their own mills, plant orchards and to sow grass and keep livestock. Sir George Grey, reporting to Earl Grey, Secretary of State for Colonies in March, 1849, writes:—

> "It will be interesting to your Lordship to be informed that during my journey through the extensive and fertile districts of the Waikato and Waipa I was both surprised and gratified at the rapid advance in civilisation which the Natives of that part of New Zealand have made during the last two years. Two flour mills have already been constructed at their sole cost, and another water

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* Hongi.

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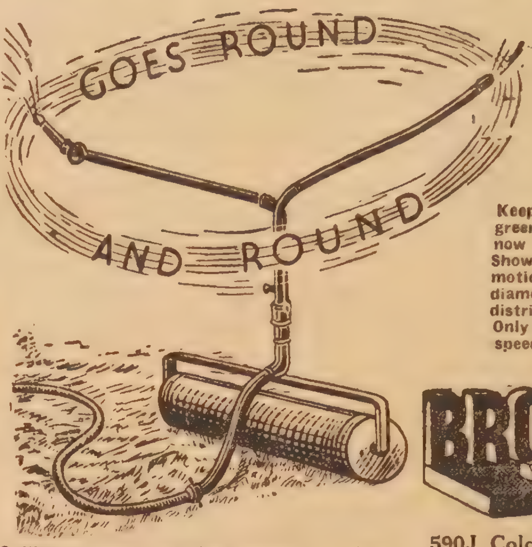

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> mill is in course of erection. The Natives of that district grow wheat extensively; at one place alone the estimated extent of land in wheat is 1,000 acres. They have also good orchards with fruit trees of the best kind, grafted and budded by the Natives. They have extensive cultivation of Indian corn, potatoes, etc., and they have acquired a considerable number of horses and horned stock. Altogether, I have never seen a more thriving or contented population in any part of the world . . ."

Sir George Grey presented the Rangiaowhia Natives with a pair of horses, a dray and harness, and plough and harness. The gift of the plough stimulated farm development, and Mr. Morgan records:—

> "The value of the flour sent down this year from Rangiaowhia and now ready for the Auckland market may be estimated at about £330. Of this sum upward of £240 was or will be spent in the purchase of horses, drays, and ploughs. Each little tribe is now endeavouring to procure a plough and a pair of horses, and the people expect during the next year to have at least ten ploughs at work."

In a passing reference to dairying Mr. Morgan writes, "One of the chiefs at Rangiaowhia . . . has several cows, one of which he generally milks in the morning."

Farming in the Te Awamutu, Rangiaowhia, and Kihi Kihi districts reached its zenith in the fifties. Dr. Ferdinand von Hochstetter describes Rangiaowhia village during his visit in 1859 as surrounded by extensive wheat, maize, and potato plantations;

> ". . . broad carriage roads run in different directions; numerous horses and herds of well-fed cattle bear testimony to the wealthy condition of the Natives, and huts scattered over a large area are entirely concealed among fruit trees . . . here a courthouse, there a store; further on a mill and mill pond . . . such is Rangiaowhia, which by its central position in the most fertile district of the North Island and as the central point of the corn trade bids fair to rise ere long to the rank of a flourishing staple town."

The enthusiasm of the Maoris for farming and trade declined with the outbreak of the Taranaki war, and finally the Waikato war ended Maori farming there. Rangiaowhia village was burnt to the ground, the Maoris driven from their farms, their land confiscated, and the country settled with Europeans.

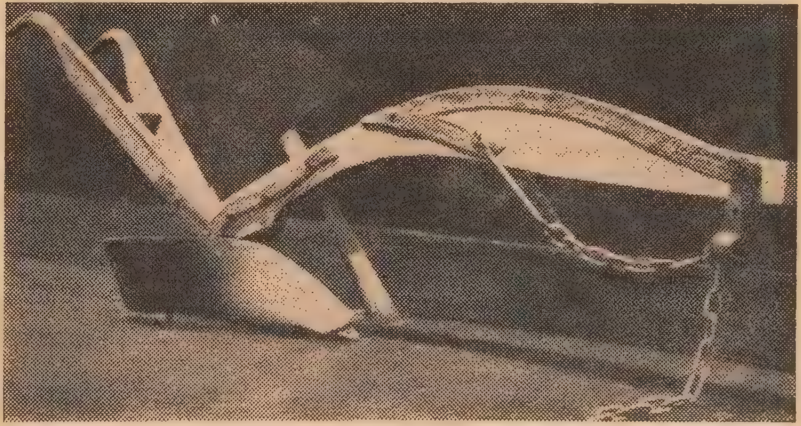
Many of the early missionary settlements are still recognisable in the countryside by the plain but dignified and well-sited mission houses and churches and by plantations of English trees. The Rev. Samuel Marsden was the directing force of the missionary farmers, and his ideas were best exemplified in the work of Messrs. Davis and Morgan, while the Rev. Archdeacon Williams of Waiapu was one of the pioneers of the pastoral age.

The influence of missionary farming undoubtedly improved and widened the scope of Maori farming, and it was to the Maoris that the initial settlers looked for food supplies. The Maoris were skilled in handling their crops of potatoes, kumara, and maize, and this skill was undoubtedly made use of in the initial work of European land development.

European Farming 1840-55

The early settlers when they arrived in New Zealand found the country clothed in bush (forest), fern, scrub, and tussock. In the North Island it was apparent that the best land was bush land, the next best fern and tutu, while scrub and tussock, but not invariably tussock, generally occupied poorer land. Their task was to convert the land into farms, to produce annual crops, and establish pastures for livestock. It is difficult to determine just when the practice of cutting, burning, and surface sowing bush land was adopted, but it is probable that it was copied from the Maoris. Mr. Geo. Graham, writing from Auckland in 1844 and describing his farming operations, records, ". . . I have this year sown about 25 acres of wheat upon land that had been previously cropped with potatoes by the Natives. This land was not cleared, the wood having been cut and burned down and the potatoes sown between the stumps in the usual way they cultivate their land . . ." It was only a step from this type of crop production to sowing wheat and grass in the ashes of the burn. The modern practice was well established in the fifties. Hursthouse (1861) quotes the following letter from "Pioneer," which appeared in the New Zealander:—

> "First, with a small axe or hook thoroughly clear all the underbush. This is essential to good burning and must be done before you fell a tree. Then fell away. Now, the large trees can be left standing—the fire will kill them. Some who intend their land for grass only leave standing all the trees above 18in. in diameter: others, for wheat and other crops, leave only those which exceed three feet in diameter. You see, it is a matter of expense; for a man can fell twenty ordinary trees in the time you would take for one large one. Your felling must be finished by the end of September at the latest, to give it a summer's drying. Towards the end of the following March watch well the weather. If heavy rain is 'brewing,' fire your clearing, and if you have taken care to lay your trees all one way, and down hill, and you begin your fire at the bottom, you will have a blaze that will astonish you, and a great number of light wood trees, such as tawa, will burn clear away. In a day or two you will have a rich soil covered with ashes, clear of all weeds, and fit to grow anything. If you want a crop of wheat, or oats, or barley, throw in your seed on your ashes; that's all—no digging, no harrowing. In about a month after it is up sow your grass seed among the wheat. Or if you want your grass for immediate use, you sow it alone and in six weeks you have a good bite.
>
> "Now let us see how this will pay. I put down the clearing at the highest price paid, in which all trees under 3ft. in diameter were felled.



The historic plough with which the Rev. Mr. Butler turned the first furrow in New Zealand in May, 1820.

When all above 18in. have been left only 18s. per acre has been paid.

COST

	£	s.	d.
Felling an acre	2	0	0
Seed (wheat and grass) ..	1	0	0
Harvesting		15	0
	£3	15	0

PRODUCE

35 bushels of wheat @ 5s. ..	£8	15	0

(and in addition, straw and an acre of permanent grass that will carry from six to eight sheep per acre).

"The uncleared forest, too, is both shelter and food for your cattle. They will get fat in it in the winter, when those in the open country may be only half fed.

"I admit that logs and stumps are unsightly, but what of that, if you and your stock are in plenty? Every year as they dry and decay you can put a little fire to them and they will soon all disappear."

The grass seed mixtures recommended by Hursthouse were: "For permanent pastures . . . 24lb. per acre is, perhaps, a sufficient sowing and the following has been a common mixture:

	lb. per acre
Pacey's perennial ryegrass	18
White clover	3
Red clover	3
	24lb.

"I should, however, prefer a much greater variety of grasses, and in laying down new wild land would try some seed mixture as the following:—

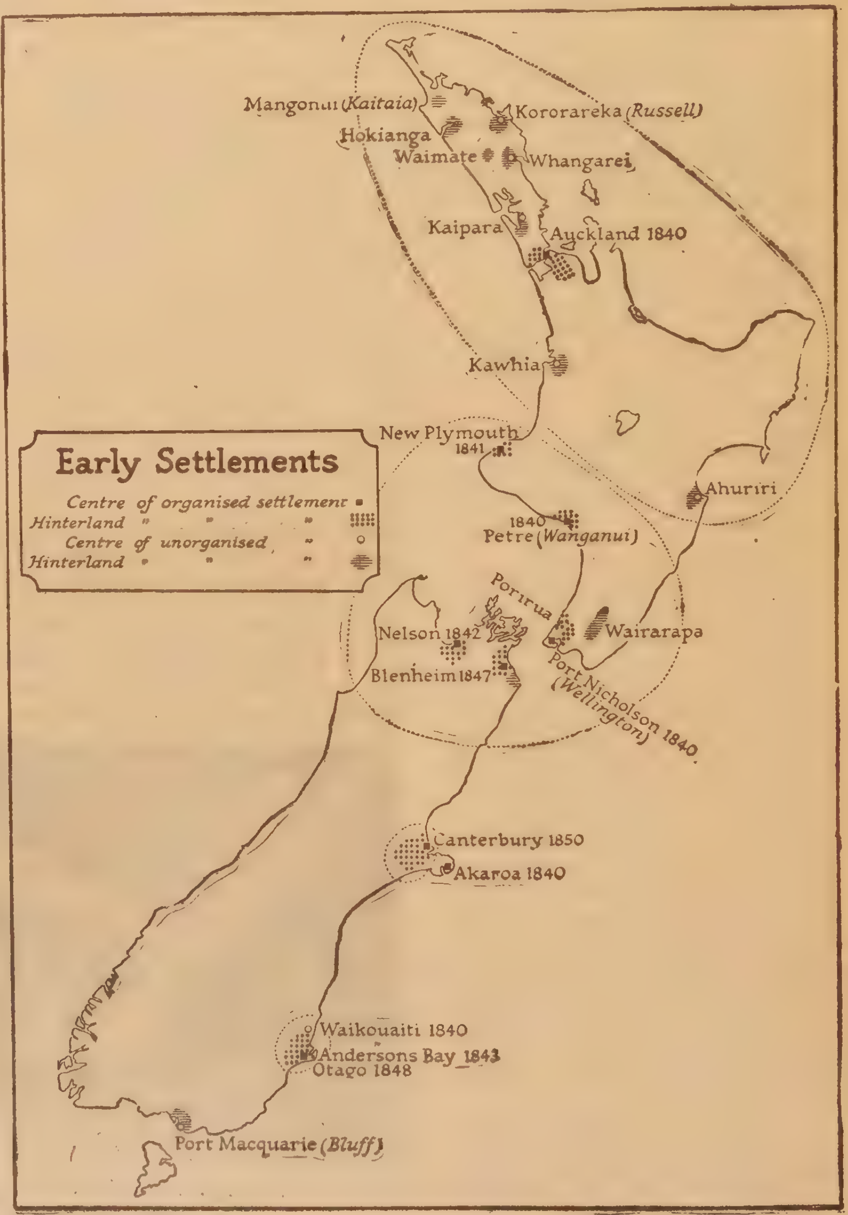
	lb. per acre
Pacey's perennial ryegrass	5
Pacey's Italian ryegrass	2
White clover	4
Perennial red clover	2
Red suckling	2
Sheep's fescue	2
Meadow fescue	1
Red fescue	1
Smooth-stalked meadow grass ..	1
Cocksfoot and foxtail	2
Trefoil, lucerne, and parsley	2
Sweet vernal and *Avena flavescens*	1
	25lb.

Thus were started the fires which were to consume some ten or eleven million acres of bush land and produce the Dominion's main pastoral lands. It is, however, interesting to note Hursthouse's comments on bush burn mixtures and his suggestions for the inclusion of lower fertility demanding grasses along with perennial ryegrass and white clover, for many of the Dominion's subsequent difficulties with surface-sown country might have been lessened if almost total reliance had not been placed on perennial ryegrass and white clover in the early sowings.

However, the prospects for the pioneer settlers on bush land were not as favourable as the comments of the early writers indicate. Bush land was not of uniformly high quality; the settlers on the Hunua hills at Auckland, for instance, found farm development there a very different proposition from that experienced by the earliest settlers on the basic volcanic soils of the Auckland isthmus. Certainly crops of wheat and grass could be sown after clearing and burning, but once all the bush was cut the position often became desperate on comparatively small holdings. Further annual cropping necessitated the stumping of the land before ploughing; dairying, except in the immediate vicinity of the towns, was unpayable, and the problem of winter keep (except of cattle, which were wintered in the bush) was as difficult as the problem of producing cash crops. It was not until the advent of the freezing industry and the development of large-scale sheep farming that the conversion of bush to grass was developed very rapidly.

Fern and Tutu

Fern and tutu land was considered sour by the early settlers and the fern roots were a great worry. Hursthouse, commenting on the various classes of land, states, "Fresh fern land is at first infertile through what we call 'sourness.' An acre broken up and sown at once with any crop, say wheat, might not yield five-fold; an adjoining


Early Settlements
Centre of organised settlement ■
Hinterland " " " ▦
Centre of unorganised " ○
Hinterland " " " ▤
Mangonui (Kaitaia)
Kororareka (Russell)
Hokianga
Waimate
Whangarei
Kaipara
Auckland 1840
Kawhia
New Plymouth 1841
Ahuriri
1840 Petre (Wanganui)
Porirua
Wairarapa
Nelson 1842
Blenheim 1847
Port Nicholson (Wellington) 1840
Canterbury 1850
Akaroa 1840
Waikouaiti 1840
Andersons Bay 1843
Otago 1848
Port Macquarie (Bluff)

acre, fallowed a few months, might yield forty-fold. Animal manure does not destroy 'sourness.' The new soil is full of raw vegetable matter and **lime** would probably prove the true 'quickener' . . ."

The early directions for cultivating fern land were to burn the fern, grub up the tutu stumps, plough and fallow, and sow in grass. Without steel fencing wire and sufficient cattle and sheep for crushing the young fronds, fern land development was particularly difficult. Fences were constructed with a ditch reinforced with posts and rails. Mr. Geo. Graham records in 1844: "For a ditch and bank with a hurdle fence at top I paid 1s. 6d. per perch. The ditch is 4ft. wide at the top, 9in. at the bottom, and 3½ft. deep. Thus a farm 28 chains long and 20 chains wide which would contain 56 acres would cost to fence this way £28 10s., or something less than 10s. 4d. per acre."

Surface sowing of grass on fern land after burning and surface harrowing were also recommended at an early date, but extensive fern land development, as with bush land, had to await the development of the sheep industry.

Scrub Land

Manuka scrub land was considered very infertile by the early settlers and continued to be neglected until during the past two or three decades. At Auckland, once the fertile basic volcanic soils of the isthmus were developed, progress was hindered because the adjoining scrub-covered gumlands were so intractable. The production of annual crops on these soils was quite impracticable and successful grassing had to await the advent of lime and phosphatic fertilisers.

Grassland

Tussock grassland originally covered the Central Plateau and parts of Hawke's Bay in the North Island and practically the whole of the land on the east of the main divide in the South Island. The tussock areas of the Central Plateau were remote from early settlement, and the soil was poor and unsuitable for farming with the facilities then available (although Bidwell remarked in 1839 on the prolific growth of red clover on the pumice land and considered the soils could not be as poor as they looked). In Hawke's Bay and the South Island the ploughable areas of tussock land greatly facilitated settlement, and crop and pasture production was a comparatively easy matter. The land could be ploughed and fallowed for a few months and would then yield abundant crops of cereals or pasture. Hence farm development in the South Island was more rapid than in the North.

Settlement and Farm Development 1840-55

New Zealand was settled in three spheres (see map on opposite page): The northern part of the North Island based on Auckland as the seat of Government; the southern part of the North Island and the northern end of the South Island by settlers of the New Zealand Company; and Canterbury and Otago by subsidiary associations of the New Zealand Company.

Acquisition of land was the first difficulty of the settlers in 1840. The Treaty of Waitangi reserved to the Crown the exclusive right of purchase of land from the Maoris, and the land purchases of the New Zealand Company before the signing of the treaty were immediately disputed. The hearing of land claims was protracted, difficulties and fighting occurred with the Maoris, and it was not until after Sir George Grey was appointed Governor in 1845 and assumed administrative control that farming operations were extended with confidence.

At Auckland early settlement was confined to the isthmus between the Waitemata and Manukau Harbours and on the coastal inlets of North Auckland where settlement followed the early trading and missionary stations. In 1840 Lieutenant Governor Hobson chose a site for his seat of government on the Waitemata Harbour, and as soon as it was known that Auckland was the capital people began to move there. Hobson strove to make Auckland the centre of a farming community as well as the capital, and he was successful in carrying out his schemes.

The rich basic volcanic land on the Auckland isthmus was ideal for farming. Originally covered in heavy puriri bush, much of it had been cleared by the Maoris and was covered in bracken fern at the time of settlement. The land produced excellent pastures and annual crops, but the area of really fertile land was very limited. Of the early farms probably that of Mr. George Rich was the most important in the development of New Zealand farming. He was a noted breeder of merinos, establishing his flock at Mt. Eden in 1851; in 1861 the flock was taken to the South Island, Mr. Rich, senior, settling in Canterbury and Mr. Rich, junior, in Otago.

Wellington was the scene of the first organised settlement on the Wakefield plan. The first ship of the company, the Tory, arrived at Port Nicholson on September 20, 1839, and Colonel William Wakefield "purchased" from the Maoris over 20,000,000 acres of land. The first settlers arrived on January 31, 1840. Others soon followed, and a total of 1,000 settlers arrived within a few months. The New Zealand Company and the Central Government were soon in conflict over the legality of the original land purchases, and vexatious delays and difficulties occurred before the company's settlers secured their land.

[*Photo by A. Hamilton, 1898.*

Maoris using the *ko* or digging stick. The early traders, missionaries, and early settlers relied largely on crops raised by the Maoris for their food supplies, for the Maoris were skilled cultivators of food crops.

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The Wellington settlers took up land at the Hutt and along the coast from Porirua northward. Unorganised settlement, relying on private arrangements with the local Maori land owners, soon spread up the Wairarapa, and it was here that Messrs. Bidwell, Clifford, Weld, and Vavasour developed sheep farms in the early forties, marking the first stage in the development of the pastoral age. Other sheep farmers took up land in southern Hawke's Bay, Messrs. Northwood and Tiffen establishing a station at Pourere Bay between Cape Kidnappers and Cape Turnagain in 1848.

Early sheep farming consisted in grazing merino wethers (imported from Australia) for wool on the bracken hills and tussock flats, burning eventually converting the land into danthonia pastures.

Wanganui, New Plymouth, and Nelson were offshoots of the Wellington settlement. Late in 1840 about 200 settlers from Wellington, dissatisfied with their prospect of not being able to obtain land handy to the port, migrated to Wanganui (first known as Knowsly and later altered to Petre and subsequently to Wanganui). Under the auspices of the New Zealand Company the New Plymouth Company was founded to colonise the area round New Plymouth with people from Devon and adjoining counties. The first settlers arrived in 1841. The company later founded its fourth settlement at Nelson in 1842.

Otago was founded in 1848 by the Otago Association with settlers of the Free Church of Scotland. There was, however, a previous settlement at Waikouaiti formed by John Jones, who had established there several families from Sydney in 1840-41, and the Otago settlers received their early supplies from this settlement and from a settlement founded by Anderson (after whom the bay at Dunedin was named) in 1845.

Canterbury was founded by the Canterbury Association in 1850 with English settlers. There were, however, previous settlers. A Captain Leathart had some 30 head of cattle at Akaroa in 1839 and sold the farm that year to William Rhodes, who was later joined by his brother George, and the brothers later farmed under the name of W. B. Rhodes and Company. Akaroa was settled by the French in 1840, and James Herriott arrived on the plains at Riccarton in 1841 and John and William Deans in 1843. The Deans brothers brought with them 61 cattle and 43 sheep. By the time of the established settlement of Canterbury (1880) the Deans were reported to have possessed 300 cattle, 1,500 sheep, and 30 horses. Their milk, butter, and meat found a ready market with the first settlers of the province.

The South Island settlements of Otago and Canterbury did not encounter the difficulties experienced by the North Island settlements. They were well organised and progress was not interrupted by land troubles with the Maoris. The land in Canterbury, particularly, was of excellent quality, covered only in tussock and presenting no impediments to cultivation.

In 1840, when New Zealand became a British possession, it was a part of the colony of New South Wales. In the following year it became a separate colony under a Governor and Executive Council. For several years the Government was conducted from Auckland, an arrangement which difficulties of transport rendered extremely unsatisfactory. The colony was divided into two provinces in 1846, and in 1852 the Constitution Act granted New Zealand representative government and six provinces each under an elected superintendent and council. These provinces, which came into being in 1853, were Auckland, Taranaki, Wellington, Nelson, Canterbury, and Otago.

The first Census was taken in 1851 and the second in 1858, when the population was 59,413 (34,179 in the North Island and 25,234 in the South). In 1853 the population had been estimated at 29,000 and was approximately as follows for the various provinces:—

Auckland	10,853	
New Plymouth ..	1,985	
Wellington	6,000	(estimate)
Nelson	5,148	
Canterbury	3,000	(estimate)
Otago	2,391	
	29,000	(approx.)

The first fairly complete returns of farm statistics were collected in 1855 but did not include considerable areas of Maori farm lands in the North Island. The livestock numbers were as follows:—

Sheep	761,913
Cattle	73,713
Pigs	28,041
Horses	7,184

Sheep were already assuming importance as suitable grazing areas were being found in the South Island.

The areas of developed land and areas under crop in 1855 are given in the table at the foot of this page.

The early settlers were first interested in the production of cereals and other food crops and later in wool. After local food requirements were met the Sydney market was looked to for the sale of surplus wheat, potatoes, butter, and cheese, and it was from Sydney that livestock were imported. The values of the main exports for 1855 were as follows:—

	£
Wool	93,000
Agricultural produce ..	179,000
Timber	9,000
Gum	5,000
Oil	9,000
	£295,000

Potatoes, mainly from Maori holdings, formed more than half the value of agricultural produce; export was mainly to Australia, where the gold rushes caused food to be scarce and dear.

Summary

The period reviewed covers the early settlers' reaction to the wild lands of New Zealand and the methods they adopted to make them productive. By force of circumstance they had to practise subsistence farming at first, but what they wanted were farming systems which would allow of the large-scale use of land and the development of a stable export trade. This they were to find almost immediately in the development of the pastoral industry on the tussock grasslands of the South Island, and this development is described in the next article in this series "Farming in New Zealand." Progress, however, in many of the North Island settlements was very slow, and the practice of partial subsistence farming had to continue until first the meat industry and later the dairy industry made possible the economic development of North Island bush and scrub lands.

DEVELOPED LAND AND AREAS UNDER CROP IN 1855

Province	Fenced	Cultivated	Wheat	Oats	Potatoes	Grass
Auckland ..	43,761	27,138	1,224	2,108	2,124	19,622
New Plymouth	7,056	7,800	660	423	255	6,110
Wellington ..	11,614	10,531	573	727	543	7,938
Nelson	11,401	12,168	3,379	730	757	4,305
Canterbury ..	12,261	6,462	3,171	730	971	815
Otago	Not given	3,824	1,267	687	380	1,314
Totals	86,093	67,923	10,274	5,405	5,030	40,104

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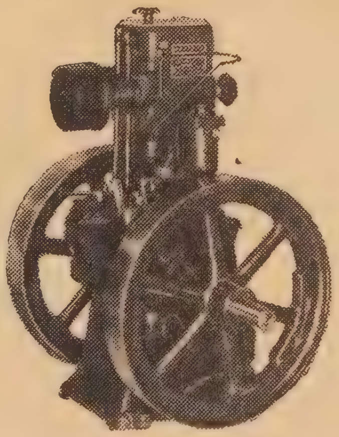

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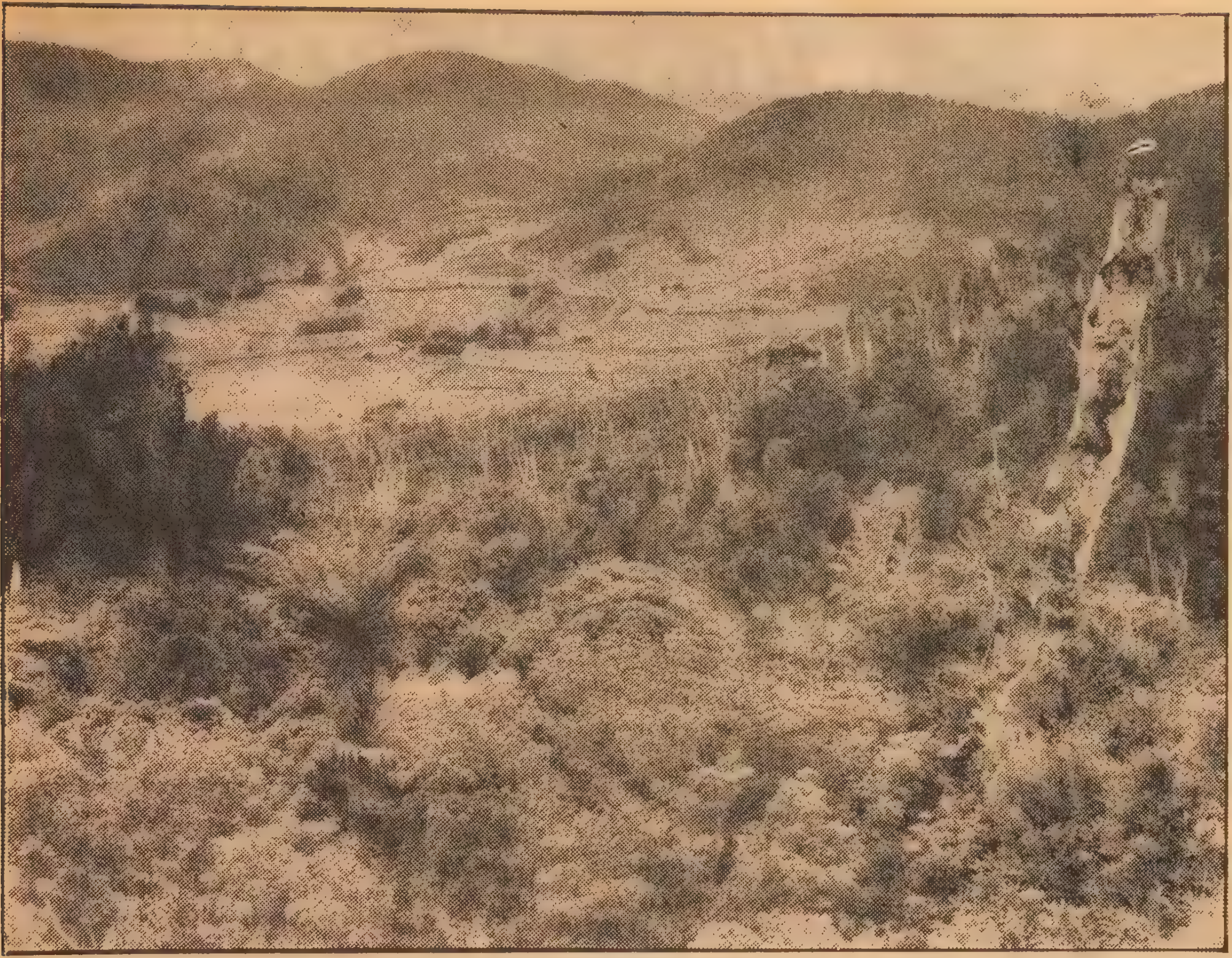

Second Growth Control in South Otago

By J. G. RICHARDS, *Instructor in Agriculture, Balclutha.*

IN many regions of New Zealand the vegetative cover today differs greatly from that which existed when the pioneers arrived. In the broadest of classifications this vegetative cover was of two distinct types, and chief among the factors governing their distribution was rainfall. Where rainfall was high an association of native trees and shrubs thrived, forming the famed New Zealand bush; where the rainfall was low the plants forming the ground cover were tussocks and other xerophytes. With the growth of New Zealand's farming industry several million acres of each type have given way to pasture land, and the species dominant in the pastures are English and other introduced grasses and clovers. In many cases these introduced species have thrived so well under present farming methods that they have even ousted native species from their natural areas. On the other hand many of the native plants are constantly trying to regain their former place, and as the introduced species have a much higher productive capacity the New Zealand farmer is ever on the alert to maintain his production and check the reversion of his pasture land.

INVADING native species cause the greatest concern under high rainfall conditions—more than 40in. a year—and particularly where pasture has been established on unploughable land. This problem of pasture land reverting to secondary growth constantly confronts settlers in the Catlins district of South Otago, and in 1939 the Government introduced a scrub-cutting scheme to assist those farmers in their efforts to retain their unploughable pasture lands.

The plant species which cause the most trouble are wineberry (*Aristotelia racemosa*), fuchsia (*Fuchsia exorticata*), boxwood (*Cassinia fulvida*), manuka, and bracken fern. In a survey carried out in 1938 it was estimated that about 20 per cent. of the area of each farm and 45 per cent. of the area of surface-sown bush land had reverted and was clothed with these species.

Review of Areas Cut

Under the scrub-cutting scheme areas were cut on 53 properties and the total area of secondary growth felled

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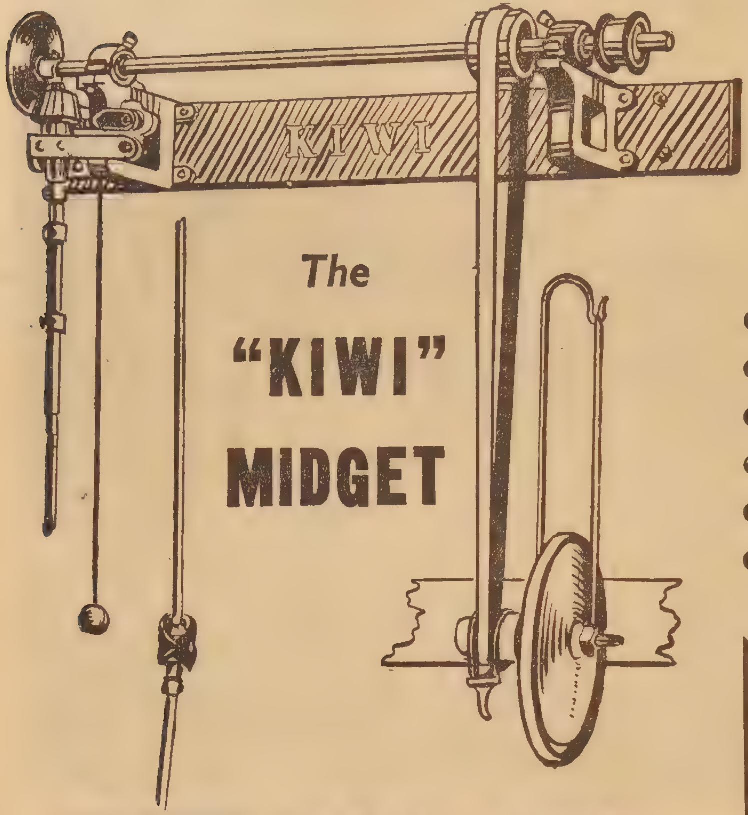

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was 988 acres. Work was begun in February, 1939, and continued until the following September, during which time up to 43 men were employed. A typical cross-section of the areas cut was recently inspected and salient points were noted in the control of this secondary growth on unploughable land.

With few exceptions the majority of the areas were reverting to an association of fuchsia and wineberry (Fig. 1). From the tall and profuse growth on some blocks it was apparent that reversion had begun within two years of the scrub being cut and burned.

Apart from supplying meals to the workmen, no costs were borne by the farmer, the State paying all wages, but the farmer had to agree to treat his area as recommended by the committee in charge of the scheme. For instance, he had to produce written evidence that he would sow out the area with an approved seeds mixture, and fence and stock to the best of his ability. In practically all cases farmers honoured their obligations, but where they did not do so the reversion was most rapid.

For the successful maintenance of pasture on this unploughable land the settler must consider many factors of prime import, and these factors are very closely linked. They are:—

1. The size of the area to be felled.
2. The time at which the scrub is felled.
3. The necessity for first-class burns.
4. The availability of stock to crush the growth.
5. The logging-up of unburnt debris.
6. Pasture species to be included in the seeds mixture.
7. Manurial treatment.
8. Pests such as rabbits.

Size of Area to be Cut

Men who are efficient at cutting secondary growth are almost invariably at a premium, and when a farmer obtains the services of scrub-cutters he usually wants to use their services to the fullest and tries to fell as much scrub as possible. The felling of large areas of scrub on any property is quite in order if the farmer is able to handle the regrassing of the area, but in many cases where large blocks are cut and burnt that is the only treatment they receive, and they rapidly revert to scrub.

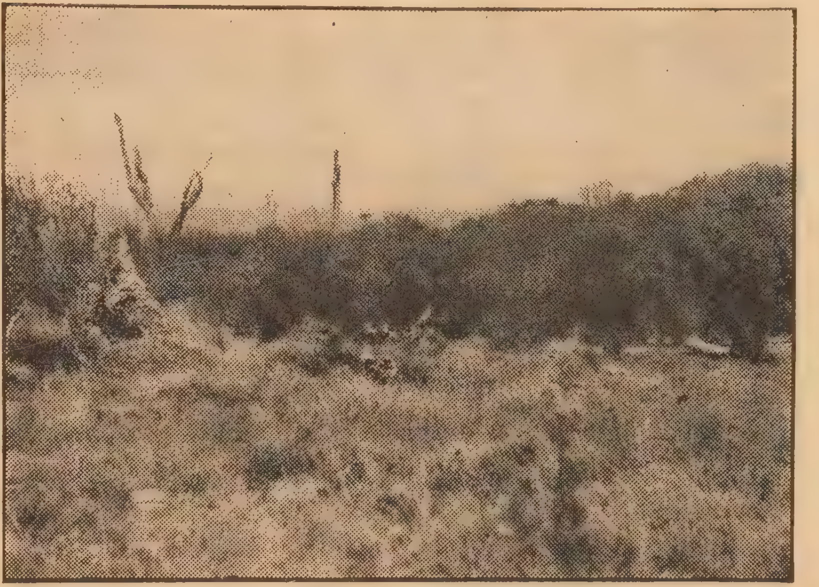

Fig. 1—Regeneration from old fuchsia stumps where the burn was poor.

It is imperative, therefore, that the area of scrub cut each year be of such size that, with the aids of management he has available, the farmer is able to sow out and properly control it. Too often areas have been felled and not even burnt, solely because the farmer is too occupied in other directions to undertake the work.

Time to Fell Scrub

In the Catlins work many poor burns were obtained, and the chief reason was not the lack of a good fanning wind but the absence of sufficient foliage to carry the fire. The quantity of foliage available to carry the fire—particularly in the case of deciduous trees, such as fuchsia—is governed by the time of the year at which the scrub is felled. The best time to fell this type of secondary growth is in September and October, when the sap is on the rise and leaf production is at a maximum. It is freely admitted that most of the Catlins scrub was felled much too early in the year, but in that case the availability of labour governed the time of cutting.

When scrub is cut in September-October it is usually ready to fire in December, and sowing out at this period of the year on the ash of the burn should allow sufficient time for the young pasture to become well established before the winter.

Necessity for Good Burns

Unless a good clean burn is obtained, the successful establishment of grass on this unploughable country is most difficult. The essentials for a good burn are adequate foliage and a good fanning, but not too vigorous, wind. Under a poor burn reversion is taking place most rapidly from old fuchsia stumps and roots which are not killed by the fire and from heaps of unburnt logs and sticks which become a nursery for fern and other undesirables. Fig. 1 shows regeneration from unburnt fuchsia stumps and Fig. 2 shows a typical fern nursery among logs and sticks. In Fig. 3 the right-hand side shows little reversion after a good burn, whereas the left-hand side shows complete reversion to fern after a poor burn.

Stock Management

It is imperative that adequate stock be available to crush and graze the growth. Cattle are the most efficient, and areas were seen that had reverted because insufficient cattle beasts were present at the required time.

Logging-up of Debris

On areas where major success has been obtained the farmers' management practice has included the logging-up of burnt and sown blocks. Logs and stumps are removed by gelignite, or by horses or tractor, and

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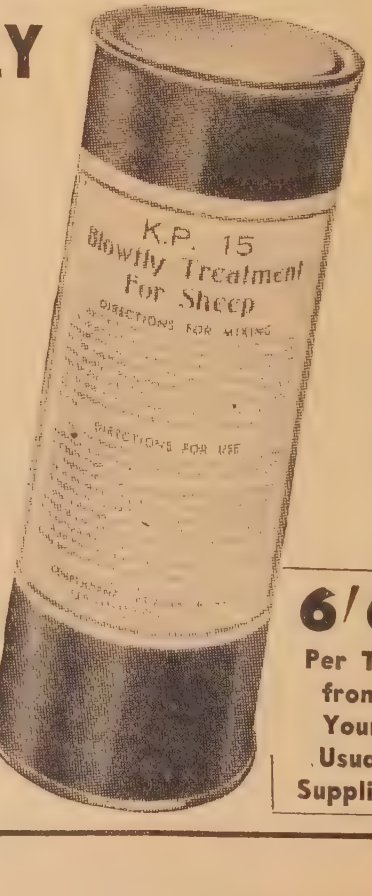

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piled into heaps for burning; it is customary to form these heaps about regenerating fuchsia so that the heat will kill the plants.

Logging-up of an area should be done as soon as possible after the sward has become established, and the size of the area to be coped with is important. If too large an area be felled, it may be some years before the farmer can log up the whole block and much of it may revert in the meantime. By the use of bulldozers logging-up can be greatly facilitated, and good use has been made of these machines.

Seeds Mixtures

In some cases blocks of scrub were felled and burnt but were not sown out. That practice is very wasteful, for the scrub immediately comes in and again occupies the area.

On blocks cut under the scrub-felling scheme and sown out cocksfoot was predominant as a pasture species in the seeds mixture, and where it is growing in association with legumes such as white clover and *Lotus major* this grass is giving excellent results in providing feed. Cocksfoot was included in mixtures in quantities ranging from 8 to 14lb. It cannot be too strongly emphasised that only the best strains of grasses and clovers should be used as the components of a seeds mixture for sowing out on scrub burns, and the following might be recommended:—

	lb. per acre
Certified perennial ryegrass	12
Certified cocksfoot ..	10 to 14
Certified white clover ..	1½
Lotus major	1
Browntop	2
Crested dogstail	4
	30½ to 34½

Value of Liming

An encouraging feature to be noted in the Catlins district is the farmers' awareness of the benefits to be derived from the use of lime. The amount of lime delivered into this district is increasing yearly, and on properties where lime has been used for some years the results are most evident. The soils in the Catlins district have developed under bush, and their lime requirement varies with the type of forest trees which formed the cover.

The continued use of lime and phosphates on grassland in this area is certainly warranted.

Control of Rabbits

The ravages of the rabbit are too well known to need elaboration, but it may be emphasised that full effort should be made to check them during all seasons. Too often the life of a pasture is seriously reduced by their depredations in its establishment stages.

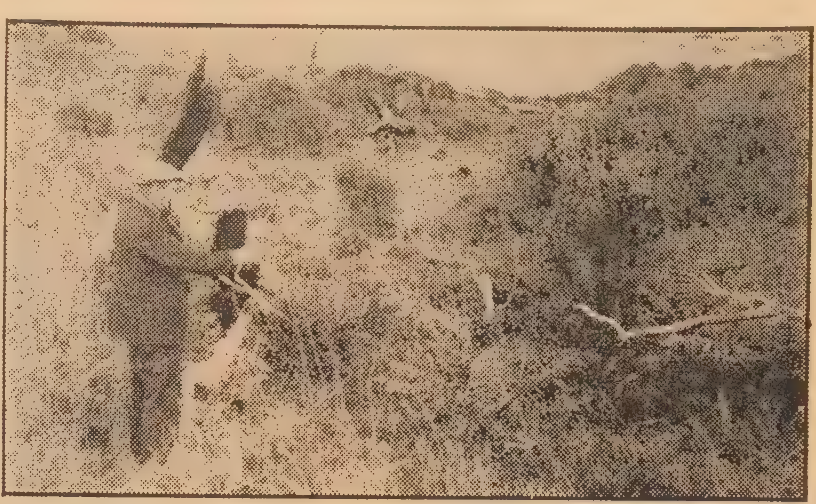


Fig. 2—Unburnt logs and sticks provide a nursery for such growth as fern.

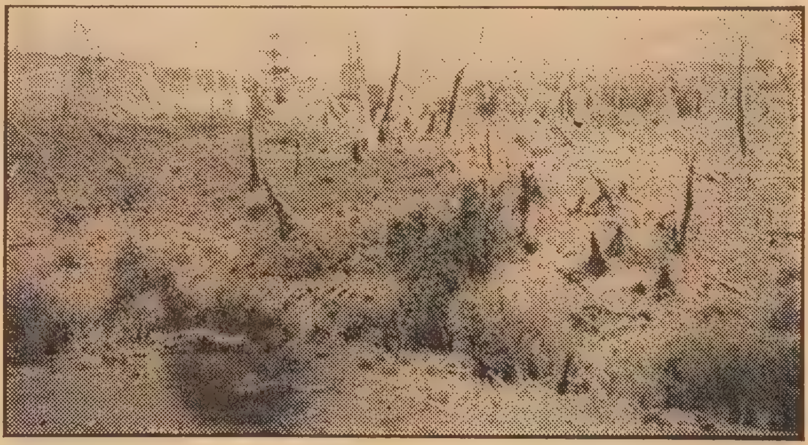


Fig. 3—Results of a poor burn on the left and of a good burn on the right.

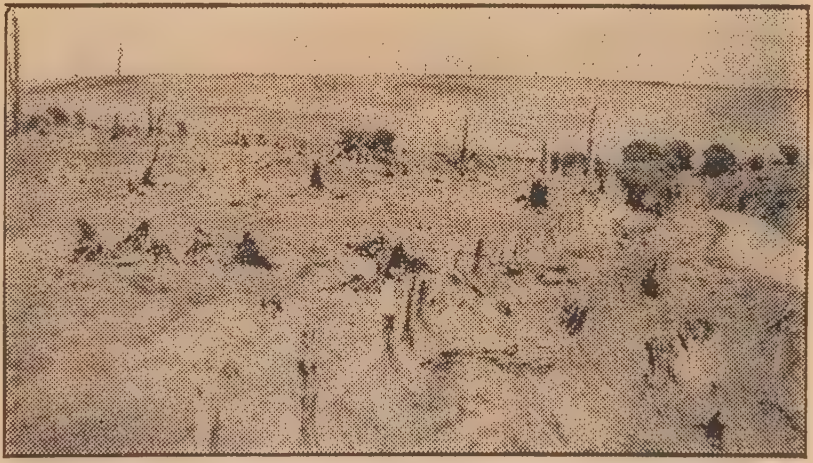
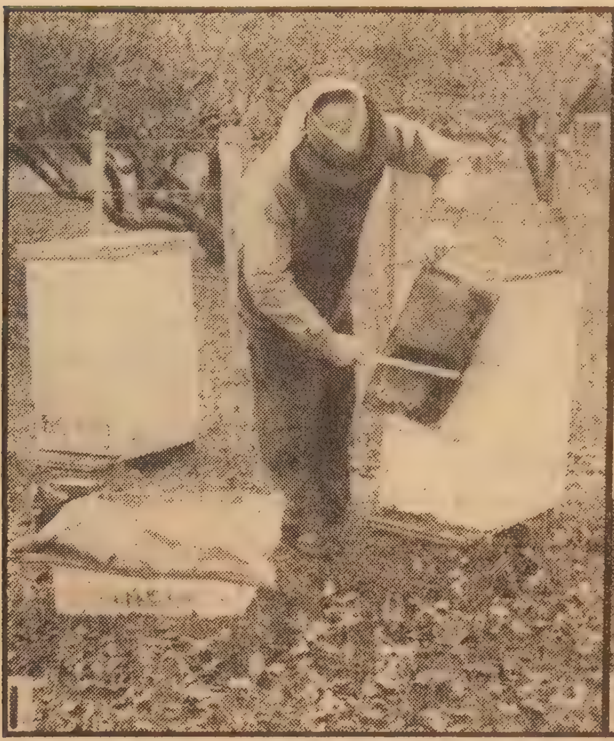


Fig. 4—Cultivated land in the Catlins district, showing the typical dark brown "mossbanks" common in some areas. Lime is necessary for the proper utilisation of this land.

METHODS USED IN REMOVING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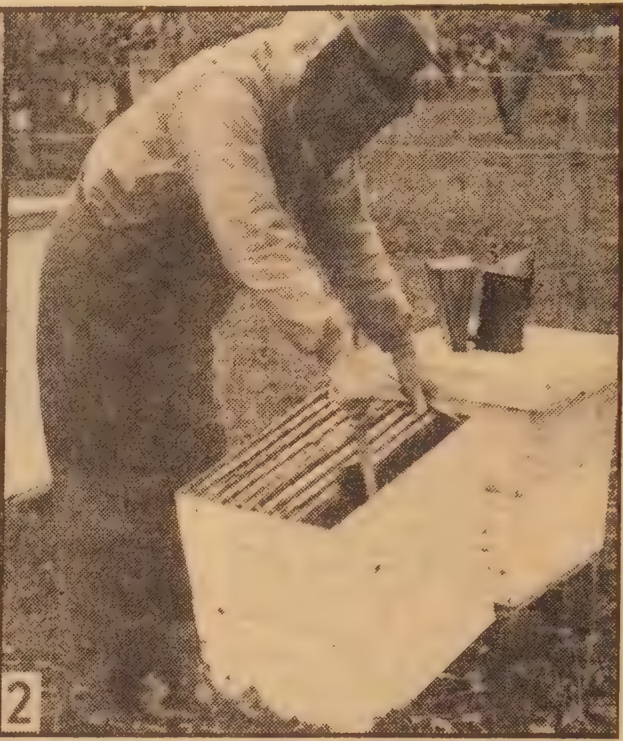
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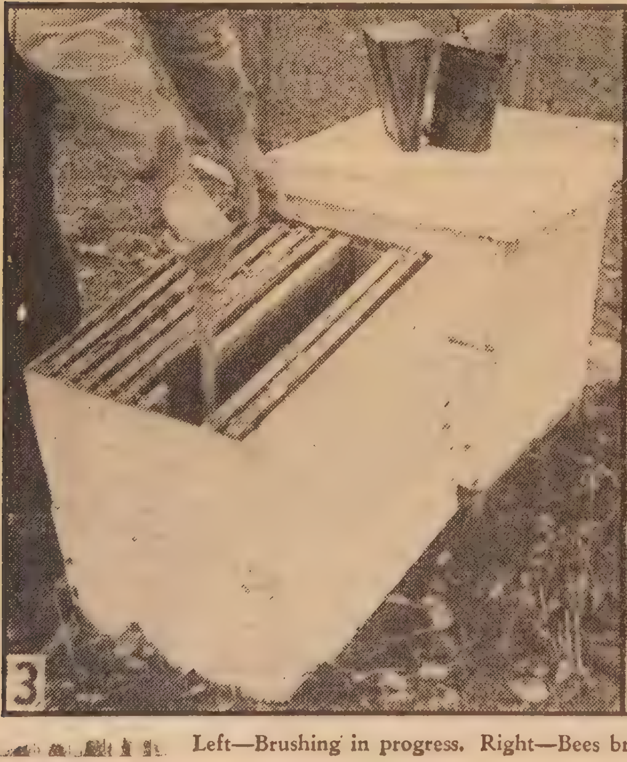
Left—A slow and unsatisfactory method of brushing bees off combs. Right—A super placed on an empty box with one frame removed for brushing.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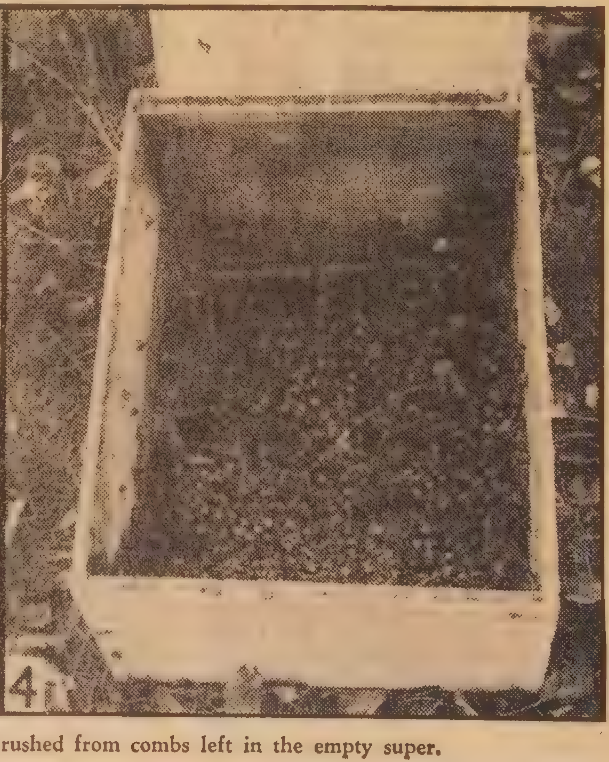
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Left—Brushing in progress. Right—Bees brushed from combs left in the empty super.

SURPLUS HONEY FROM HIVES

By L. H. JOHNSON, *Apiary Instructor, Palmerston North.*

THE main problem to be overcome when planning to take surplus honey from beehives is how to remove bees from the supers quickly without damaging the honey or unduly aggravating the bees. To facilitate the harvesting of the honey crop the beekeeper may choose either of the two methods described in this article. In practice these methods can be utilised to their full advantage only if colony management leading up to this period has been thorough and the hives used are not only sound but are standardised.

IN search of an effective and quick method of harvesting honey, some commercial beekeepers adopted the Phenol screen system, which gave promise of being a success. But later it became increasingly apparent that all honey extracted from supers which had been cleared of bees in this manner could not escape being unmistakably tainted, mildly or pronouncedly, by the carbolic acid fumes. Consequently this method cannot be recommended. Smoke should be used sparingly as honey is also susceptible to smoke taint.

Unsatisfactory Methods

The practice of lifting off whole supers and shaking the bees out of them in front of the hives is laborious and unsatisfactory because too many bees cling to the combs and later become a nuisance when the supers are taken into the extracting house.

The method of plucking frames of honey singly (Fig. 1) and brushing the bees off in front of the hive is comparatively slow, and suspending heavy combs of honey with one hand and using the brush with the other soon becomes hard work. The bees become very irritated and aggressive, and numbers settle back on the comb.

Brushing Bees

For a satisfactory method of removing bees by brushing, first place an empty super on the ground in front of the hive with one end resting on the floor-board. Smoke the bees at the entrance, then under the hive cover and mat, before their removal. Prise the supers apart with a hive tool and lift the top super of honey down on to the empty box in front of the hive. If there is a honey flow at the time, a super of empty combs should be added to the hive. Then replace the mat and cover to prevent disturbance of the bees inside.

Remove one comb on the far side of the super, and with the brush sweep the bees off the side of the hive and one side of the comb (Fig. 2). Holding the bee brush in one hand and the hive tool in the other, move the next frame over to the side of the hive, and, with a sweeping motion from end to end of the frames, brush the bees off the two sides of the combs (Fig. 3). A quick sweep across the face of each comb is usually sufficient to dislodge all adhering bees, which fall down in front of the hive inside the empty box, and are no further trouble. This manipulation of the frames may be repeated right across the super until all the combs have been brushed free of bees.

The full super of honey is then lifted on to the apiary barrow or truck and covered. Give the empty super on the ground a good shake to dislodge the remaining bees (Fig. 4) and move on to the next hive. With practice this system can be applied more speedily, more easily, and with much less disturbance of the bees than by other brushing methods.

Bee Escape Boards

The use of escape boards is without doubt the best system yet evolved for clearing supers of honey and taking them off the hives quickly without disturbing the bees or damaging the honey.

The Porter bee escape is a small metal trap so designed that a bee may pass only one way between two thin pieces of spring steel. It is fitted to a horizontal division board made of ½in. thick timber with a ⅞in. by ½in. margin strip fixed on one side and made to the outside dimensions (usually 20in. by 16in.) of the hives in use (Fig. 5).

Before putting the escape board on the hive it is advisable to examine every Porter bee escape carefully, as often the metal surface is so smooth that a bee may have difficulty in obtaining sufficient foot-hold to push its way between the springs. That may be overcome by scratching or roughening the surface of the metal.

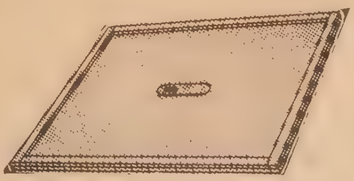

Fig. 5—A bee escape board.

To place the board in position loosen the top honey super, tilt it up on one end, and slide in the escape board as far as it will go; then lower the super on to it and adjust all in position on the super below. It is a simple operation which does not take long, nor does it disturb the bees greatly. As soon as the bees realise that they are imprisoned they search for an exit, find the bee escape, and pass down through it until all are out of the super.

Sound, neat-fitting hive material is essential to prevent robber bees gaining access to the honey. Usually about 24 hours pass before all the bees are out of the honey super, but if two bee escapes are provided, quicker clearance of bees is effected and there is less danger of a blockage.

If there has been no previous adjustment of the brood, and some has been allowed to remain in the top supers, it will be found that a number of bees will remain above the escape board. However, no such trouble with the bees or losses of queens will occur where queen excluders are used.

Hodson Framed Screen

The Hodson ventilated screen (Fig. 6) is a modification of the former type, but it is made with wire gauze fixed to a wooden frame, the object being to allow the colony warmth to rise and maintain a normal hive temperature in the supers above. Though it may have this advantage, bees usually are slower to leave the super because of the warmth and contact through the wire gauze with the bees below.

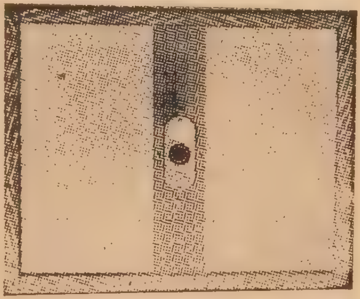

Fig. 6—The Hodson bee escape device.

Out-apiary management mainly depends on skilful organisation, especially of transport, if extra trips are to be avoided. The escape boards should be put on the day before removal of the honey, and one apiary may be worked in conjunction with another to avoid duplicated running.

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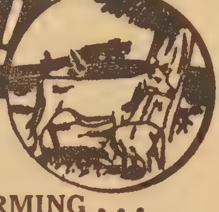

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FARM WORK FOR JANUARY

By the Fields Division

PASTURES

Autumn-sown Grass.—Land for sowing to permanent grass in the autumn should be in a forward state of preparation so that during the next few weeks only harrowing to destroy weed seedlings is required before sowing. Where lime is required it should be applied now so that it will have time to effect improvement in soil conditions before the grass and clover seed is sown. When buying Certified seed ask the merchant to allow inspection of the official purity and germination certificate relating to the line of seed. This certificate will bear the same identification numbers as appear on the tag of the bag of Certified seed. If the certificate is not of recent issue, allowance should be made for deterioration in germination which might have occurred since the test was carried out.

Land to be sown this month in Italian ryegrass for winter feed in the South Island should be firm and fine and rolled before sowing. After sowing, lightly harrow to cover the seed and roll again if the soil is light and not well consolidated.

Management of Pastures.—During the coming month patches of seed stalks should be suppressed so that the pasture is kept evenly grazed and wholly productive. The patches may be cleaned up by the introduction of hungry cattle. Keeping paspalum swards closely grazed during the coming month is particularly important, because if allowed to get out of hand, this vigorous grass will suppress other species in the sward on which stock will depend for their winter and spring fodder.

GRASS AND CLOVER SEED

Areas of grass and clover seed should be watched carefully to ensure cutting at the optimum time. If crops are cut too early, the seed will be light and immature, while there is danger of loss of a considerable portion of the crop if areas are cut too late.

Cocksfoot should be cut when the seed is well formed and firm, but still somewhat green in appearance; ryegrass when a few seeds will shake out; and white clover when 80 to 90 per cent. of the heads are brown and reflexed and the stalks are of a straw colour, at which stage bright yellow seeds can be rubbed from the clover heads by hand. With light crops of white clover special measures need to be taken to collect the seed heads as they are cut by the mower.

Harvesting of seed crops should be conducted carefully to avoid loss of seed. Such losses frequently occur in conveying material for threshing and in threshing operations.

HAY

Except in late districts, and for late grasses such as paspalum, haymaking should be finished in early January. Paspalum is best cut before the flowering stage or when only a small number of seed heads is in evidence. Watch stacks carefully for signs of overheating, and if necessary take the steps outlined in last month's notes. See that stacks are well fenced.

LUCERNE

A second cut of lucerne should be obtained early in the month. After each cut the opportunity should be taken to cultivate the stand with a penetrating grass harrow if soil conditions permit.

New stands should be ready for cutting towards the end of the month. Weeds soon have a marked effect on new stands, and frequently to an alarming extent. Most of these weeds are usually annuals, and, though they develop strongly in the first year of the life of the stand, they are not nearly as harmful as other weeds which are now less prominent but which may increase later. If weeds threaten to smother a new stand, steps may have to be taken to cut it earlier than the correct period, which is when new shoots appear at the base of the plant and the crop is in partial bloom. If possible, cutting should be avoided until this stage is reached.

CEREAL GREENFEEDS

As soon as the land is vacated by crops, areas intended for greenfeed should be ploughed and cultivated. Maize sown during October and November should be making good progress. Millet should be fed off when about 9in. high, and after grazing it should be shut up for production of further growth for feeding.

In the South Island sowing of crops required for autumn and winter production should be started. Oats sown now should be ready for the first feeding in April, and barley sown now should be ready within 8 weeks.

ROOT AND CRUCIFEROUS CROPS

Mangolds and swedes sown in wide rows and pumpkins will require further intercultivation to keep weeds in check. Intercultivation should be carried out when the weeds are in the seedling stage; at a later stage the weeds are difficult to kill. Weeding is most important during the early stages of the growth of the crops. Once the crop is well established, weeding, though of value, is of less importance. In districts where mangolds are transplanted, transplanting should finish during this month. The plants should be transplanted when the roots are about the size of a man's thumb and when the soil is moist.

Except in cold and dry climates, soft turnips may be sown this month for feeding off early next winter, and late sowings of swedes may be made in the North Island for winter feeding.

POTATOES

Digging of the main area of potatoes in the more southern districts of the North Island starts in January. The South Island main crop will require further intercultivation. The later cultivations should be lighter and narrower so as not to interfere with the growing root system of the potato. Moulding should be done gradually for the same reason.

CEREALS AND PEAS

Continue to intercultivate all maize crops for cob production to a very shallow depth.

A constant watch should be kept on all crops for readiness for harvesting, particularly where the header harvester is to be used.

Cut oats for grain with the binder when the top grains will shake. For chaff cut oats on the green side when there is a tinge of green in the stems and bind it into small sheaves.

Cut wheat with the binder when knots are still green and the grain can be marked with a thumbnail. Heading takes place with suitable varieties 10 days later with the grain containing not more than 15.5 per cent. moisture.

Cut barley when straw and knots are free of green coloration and the grain has a finely-wrinkled, hard skin.

Cut garden peas when the crop is turning yellow but before it has browned off. Field peas may be harvested at a slightly later stage to prevent shrivelling of the sample. This defect is not noticeable in wrinkled garden varieties.

STOCK

In most districts weaning of lambs will be completed early in the month. Those not fit for the works should be placed on a young growth of grass to finish fattening or preparatory to placing on breaks of rape to finish them off. Shear lambs where this is practised, cull ewes, and dip sheep. Send fat sheep to the works and buy in replacements.

Weaned calves should be rotated round the farm ahead of the milking herd. At this period the pastures will not be so nutritious for the production of milk by the dairy herd, and cows should have their feed supplemented by soft turnips or millet if these crops are available. At this time of the year attention should be paid to the provision of water for stock.

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Winter Feeding of Hoggets in Canterbury

*By T. K. EWER, *Veterinary Research Officer, Christchurch.*

A NUMBER of farmers in Canterbury over-winter hoggets. It may be only a small mob of ewe hoggets bred by the farmer himself to be used as flock replacements, or it may be a large mob of half- or threequarter-bred hoggets from the foothills for which winter grazing has been purchased on a plains farm. The type of feed used for hoggets in the winter naturally varies to some extent, but it is probably true to say that most hoggets are given either a grown crop such as turnips or chou moellier, or are put upon fairly extensive areas of pasture which may or may not be improved. Results of trials of various methods of over-wintering hoggets conducted each winter since 1940 at the Kirwee Experimental Farm are summarised in this article.

DURING 1937 and 1938 there was considerable and widespread mortality among sheep of all ages in Canterbury and further south; lambs which had been unthrifty following weaning continued to make poor weight gains, and a proportion continued to die right through the winter. Investigations begun at the Kirwee Experimental Farm at the beginning of 1940 and continued each winter since were designed to discover the effect of various methods of overwintering hoggets, and for this purpose crops of turnips, chou moellier, and greenfeed oats were grown, while areas of both good and poor pasture were reserved for winter grazing.

Since it was believed that heavy infestation with worms might be an important factor in causing hogget unthriftiness, the parasitological side has received a good deal of attention throughout the trials. The general design of the experiments has been to have a series of groups of between 15 and 20 Corriedale or half-bred hoggets of mixed sexes run on various feeds from May until September, to drench half of each group with either bluestone-nicotine solution or phenothiazine regularly, and to make weighings every three weeks to judge the thriftiness of the sheep.

Turnips and Chou Moellier

Both turnips and chou moellier are liable to wide variation through the effects of insect attack and dry weather in the autumn. Turnips show the effects of such unfavourable conditions more than chou moellier, and this is reflected in the wider variation in growth rate from season to season. Even so it will be seen that in most years the hoggets grazing them have done as well as hoggets on other feeds. The average results from both feeds are similar.

The effect of giving a hay supplement has been studied. Good-quality clover hay was fed *ad lib.* either in open wire-netting racks or in closed moveable feeders. The greatest variation in hay consumption from year to year occurred with the turnip-fed hoggets, the range being from 0.92lb. per head in 1945 down to 0.38lb. per head in 1941. On no occasion has there been any increase in weight gain as a result of having a hay supplement. On the other hand, it has always been clear that there has been a feed-sparing effect as a direct result of the hoggets eating the hay. This occurred whenever a supplement was given and whatever feed was being grazed by the hoggets.

Some sheep were given a run-out all night to pasture. The quality of the pasture available for this naturally varied somewhat from winter to winter, but could certainly be regarded as at least as good as, if not generally rather better than, the usual pasturage available in Canterbury at that time of year. But from the point of view of the weights of the hoggets, those given a run-off at night made poorer gains than hoggets receiving any other treatment.

In order to see whether giving the hoggets a fresh break of feed each week would prevent unthriftiness through enabling them to avoid reinfestation with worms, groups getting a weekly change to fresh feed were included on both turnips and chou moellier. This method resulted in no improvement in weight gain, which is not to be wondered at in view of the very low level of worm infestation throughout the sheep during each winter except 1943.

Pasture

Autumn-sown Italian ryegrass or short-rotation (H1) ryegrass was fed on three occasions, and sheep overwintered at a fairly high rate of stocking (4.1 sheep per acre) made as good weight gains as any.

The importance of autumn weather conditions for determining the amount and quality of pasture which will be available during the winter can hardly be over-emphasised. For instance, because of the bad autumn conditions in 1945 it was not possible to have young pasture available, while year-old pasture provided an inadequate amount of feed. On the other hand, in 1944 the mean weight gain of three chou moellier groups was 18.61b. and the gain of two groups on young pasture was 18.8lb. Hoggets will not thrive on poor pasture, even when the rate of stocking is low, except in a very favourable winter, and may even, as in 1945, lose weight.

Hay was also given as a supplement to pasture. Only in one year (1941), when large quantities (2.2lb. a head a day) of a particularly palatable subterranean clover hay were eaten and when the pastures were largely of an unimproved type, was the growth rate increased.

Effect of Drenching

To investigate the extent and nature of the worm infestation of hoggets during winter in Canterbury and to observe the effect of drenching has been one of the main concerns of the investigations.

Regular faecal egg counts were made throughout the course of the experiments, and half the hoggets in each group were drenched with 20 grams of phenothiazine on either two or three occasions, except in 1945, when one dose of 20 grams was given at the beginning of the experiment.

In every year except 1943 the level of worm infestation has remained low right through the winter. Therefore, it was not surprising that only in 1943 was there any response from drenching, and even in that year it occurred only among sheep on pasture.

Greenfeed Oats

There is a general belief among farmers in Canterbury that it is unsafe to feed greenfeed oats to any extent to hoggets through the winter. Field observations have shown that this is because very frequently if hoggets are put on to oats a number will develop lameness and many others not thrive properly. This condition also occurs when hoggets are kept on barley in winter. Pathological investigations of this condition revealed that it was due to rickets, a disease of growing animals in which there is interference with normal bone development.

Experiments begun at Kirwee four years ago showed that additional quantities of calcium and phosphorus, the minerals which mainly go to make up bone, given to hoggets on green oats as bone flour would not stop the

---

* Since conducting these trials for the Department the author has joined the staff of Lincoln College, Christchurch.

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development of rickets. But when additional vitamin D was given in the form of weekly doses of cod liver oil there was no rickets and the hoggets grew very much better than those which did not get the extra vitamin. A later development was the discovery that by giving one large dose of vitamin D in the form of calciferol protection could be given which lasted throughout the winter and did away with the necessity of using cod liver oil at all. For example, in 1944, between April 24 and September 4, the mean weight gain of hoggets kept continuously on greenfeed oats was 12.9lb., while the gain made on the same oats by hoggets given one dose of calciferol when they went on to the oats was 31.9lb. The percentage of rickets in the groups was 88 and 0 respectively.

The dose of calciferol used was 25 milligrams, which was dissolved in a small quantity of olive oil and given by mouth. Its cost is about 1/- a sheep, and although further investigations may show that this dose rate should be altered somewhat, it does mean that there is now available to farmers a relatively cheap, simple method of avoiding rickets and being able to utilise greenfeed oats in the winter for growing sheep.

Summary

1. Hoggets will grow equally well during the winter on turnips, chou moellier, or good young pasture, and growth is always better than on poor pasture.

2. Giving hay does not increase weight gains, except with very poor pasture, but does save feed.

3. Giving a run-out to pasture overnight always depresses growth rates.

4. Worm infestation of hoggets in Canterbury during winter is generally low, and drenching is not likely to prove of benefit. After a wet summer and autumn, however, trouble may be experienced. If this can be anticipated, hoggets which are to be overwintered should receive a 20-gram dose of phenothiazine at weaning time. They should be weaned on to pasture or feed which has not been grazed by lambs.

5. Lameness and unthriftiness of hoggets on green oats, which is due to rickets, can be entirely prevented by giving one dose of calciferol (25 milligrams) at the beginning of the feeding period.

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Harvesting of Cereal Crops

By G. A. BLAKE, *Instructor in Agriculture, Matamata.*

CEREAL crops are now nearing maturity, and a constant watch should be kept so that harvesting can be started at the proper time. If crops are cut too early, there will be loss of weight, quality, and germinating powers of the seed, combined with some overheating in the bags; if harvesting is delayed too long, losses will occur through shedding.

THE use of the header harvester has greatly reduced harvesting labour, but more skill is necessary in judging the correct stage at which to harvest.

Of the three main cereal crops, wheat, oats, and barley, oats are least suited to direct heading. They may be cut with a mower when dead ripe and threshed with a header harvester fitted with a pick-up attachment, or the crop may be cut with a binder when the top grains are ripe and the sheaves stooked for about 12 days before threshing. The crop may also be stacked for threshing 6 to 8 weeks later.

For chaff the crop is cut with the binder when slightly greener and the sheaves are made smaller to prevent mould formation.

Weed Infestation

Cereal crops are sometimes infested with late-maturing weeds such as fathen and *Amaranthus*, and their presence makes direct heading impossible because of their high moisture content. Where such weeds are encountered the crop may be cut with the binder and threshed from the stook or stacked, but if the grower has his own header harvester, he can thresh from the windrow.

The crop may be windrowed by using two binders, the first of which discharges directly over the platform canvas while the following machine discharges in the ordinary way but with the knotter disconnected. If only one binder is available, either of these methods may be used for windrowing, but more travelling with the header harvester is needed. Ten to 12 days later the crop is threshed with the pick-up machine.

Wheat

Direct Heading: The crop should be dead ripe, the grain hard, and the moisture content not above 15.5 per cent. Growers should use the moisture-testing service provided by the Wheat Research Institute, and enclose their telephone numbers and telegraphic addresses with the samples for quick reply.

Harvesting from stook or windrow: The crop is cut when the top node is still slightly green and when the grain can be marked with a thumbnail. It should be stooked or left in the windrow for 2 weeks before threshing, or stacked for at least six weeks and then threshed.

Oats

For Chaff: Cut the crop with the binder when it is still slightly green and make the sheaves small.

For Grain: Cut the crop when the top grains are dead ripe. Threshing may be carried out from the windrow, from the stook, or from the stack after 6 to 8 weeks.

Barley

Barley should be dead ripe when harvested, with the nodes free from green coloration and the grain with a hard skin, finely wrinkled. Most crops are direct headed, but may be threshed by the header harvester from the windrow or by the stationary mill from the stook or stack.

For malting barley a premium is paid for grain threshed out of the stack, and mill operators should use care in threshing barley so that the germ is not damaged. Regular inspections of the threshing drum are necessary.

When harvested other than by direct heading the straw of all cereals, if it is to be sold, should be baled as soon as possible and stored.

Pig Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in January as follows:—

Auckland—1YA, on January 15, at 7.15 p.m., "The Creep and its Special Purpose," by F. Barwell, Supervisor, Bay of Plenty District Pig Council.

Wellington—2YA, on January 21, at 7.15 p.m., "A New Method of Constructing Floors for Piggeries," by I. H. Owtram, Supervisor, Taranaki District Pig Council.

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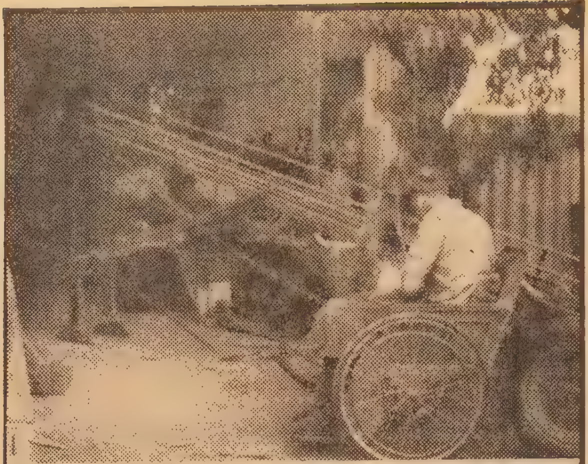
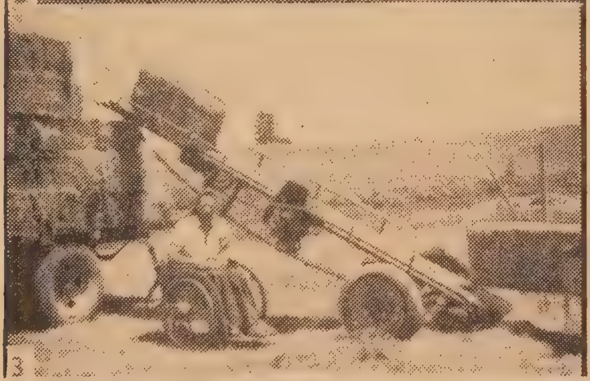




AN EFFICIENT

A SIMPLE yet efficient bale elevator designed and built by Mr. D. H. Hansen, Beeville, Taupiri, is described in the following article. All the welding and the greater part of the other work were done by Mr. Hansen working from a wheel chair. The elevator handled 600 tons of hay efficiently during last season.

THE elevator will stack up to a height of 12ft. 6in. before any further lifting of bales is required and will handle up to six bales a minute.

A good workshop is essential for the building of such a machine, and Mr. Hansen fortunately has both an acetylene and an electric welding plant and is adept in their use.

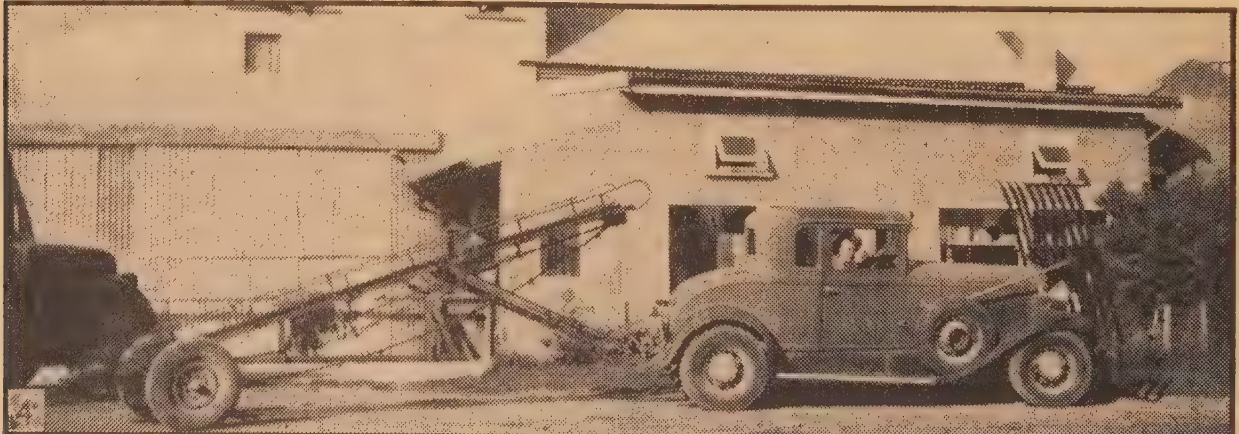
Fig. 1 shows construction in progress. The elevation is determined by passing a bar through holes drilled in a semi-circular plate.

Fig. 2 shows two bales on the elevator together, the maximum capacity being three bales at a time.

Fig. 3 shows the position of a $1\frac{1}{4}$ h.p. petrol engine (cover raised) and also the manner in which bales are automatically picked up as they leave the press. The blocks fall clear in the gap between the chute of the baler and the skid-way on the elevator.

Fig. 4 shows the method of transport, with the forward leg support forming the tow-bar. When attached to a truck in a similar manner and set in operation while travelling, the elevator can be used for collecting bales left by a pick-up baler, one man being required to place the bales on the bottom of the elevator. To facilitate adjustment to a truck for the above purpose the tow-bar has been made extensible.

In Fig. 5 the method of attachment of the engine to the main frame is shown, the engine being arranged to be perpendicular when the machine is operating at an average working height.



BALE ELEVATOR

Fig. 6 shows the general construction and the way in which the conveyor chain runs between the wooden slats.

For anyone desiring to build this elevator the accompanying drawings and the following details are submitted by Mr. Hansen:—

A 1¼ h.p. petrol engine fitted with a governor drives the machine. The designer, however, considers that a 1½ h.p. engine would be more suitable. As the method of attachment of the engine to the frame of the elevator depends largely on the design of engine available, only general details are indicated in the accompanying drawings.

In order that the float tank of the carburettor can operate always in the perpendicular position at all elevations of the machine the connection of the carburettor to the engine intake has been made semi-rotatable.

The engine is coupled to a shaft running to the top of the elevator by a V belt drive giving a 7 to 1 reduction. This shaft is coupled to the conveyor chain driving sprocket through the steering box from an old car which gives an 11 to 1 reduction ratio. Thus a 77 to 1 overall reduction ratio is obtained.

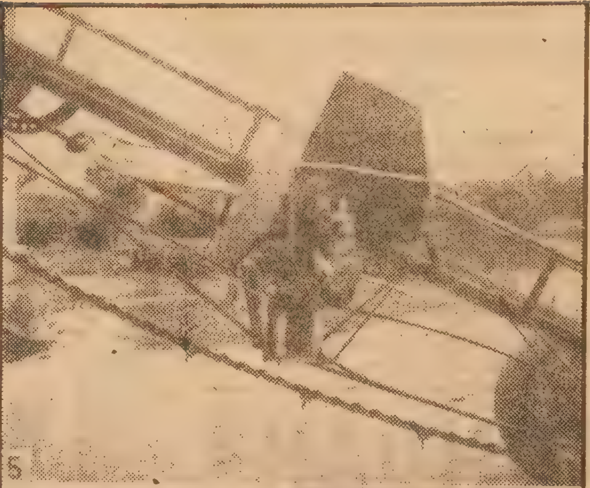
The sprocket drives an old conveyor belt which Mr. Hansen bought for £2 10s., the buckets having been replaced by 1½in. spikes placed 15in. apart to grip the bales.

At the lower end the belt runs over a pulley with a built-up collar around its centre acting as a guide for the conveyor chain.

The first 15in. of the skid-way is "dead" and consists of 1½cwt. of iron partially to counterbalance the remainder of the elevator for ease of lifting.

The designer took four weeks to build the machine.

G. L. BANFIELD,
Assistant Instructor in Agriculture, Hamilton.



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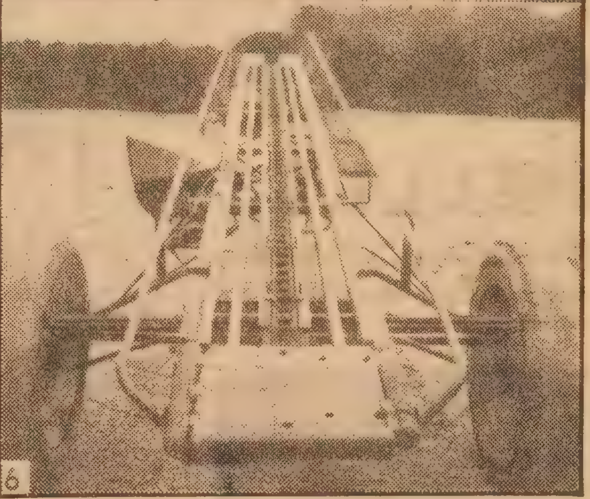

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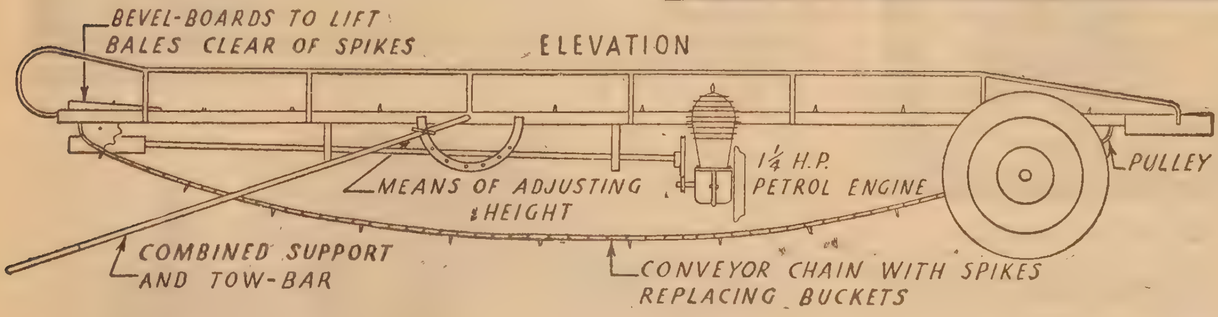
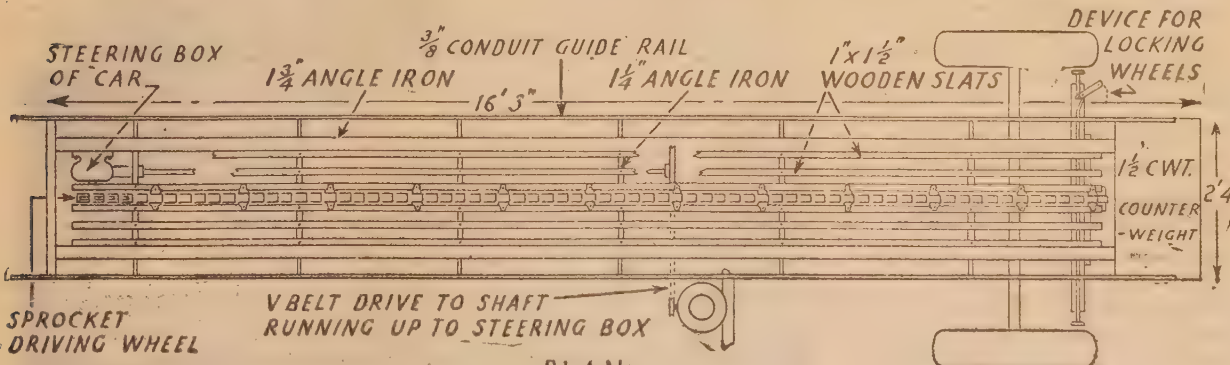


ELEVATION

BEVEL-BOARDS TO LIFT BALES CLEAR OF SPIKES
MEANS OF ADJUSTING HEIGHT
1¼ H.P. PETROL ENGINE
PULLEY
COMBINED SUPPORT AND TOW-BAR
CONVEYOR CHAIN WITH SPIKES REPLACING BUCKETS



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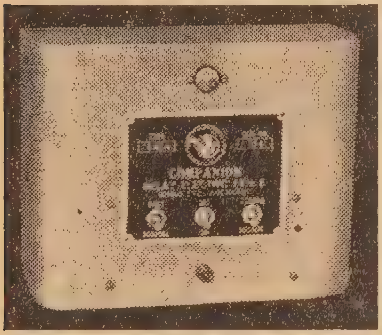

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RESEARCH INTO PROBLEMS OF MACHINE MILKING

By W. G. WHITTLESTON, *Animal Research Station, Ruakura.*

PROBLEMS obscuring a solution to the many difficulties which still beset the dairy farmer at milking time may be classified into two groups, mechanical and physiological. The milking machine is unusual among machines in that it depends for its operation on the way in which a living animal responds to its action. That means that the best mechanical solution to a problem may not be the best way to obtain over-all milking efficiency. Further, any mechanical device or method must be considered with respect to its possible effect on the health of the udder and on the hygiene of the milk. In other words, the ideal mechanical milker must fulfil the physiological requirements of the cow's organism, must have no injurious effect on the delicate mechanism of the udder, must be easily cleaned so that the milk drawn through it will be free from contamination, and must be simple and reliable so that the farmer can operate it without likelihood of its breaking down.

IF dairy farms are to be made more efficient, and if the unpleasantness of tugging at a recalcitrant cow's teats on cold wet mornings while the rest of the world is snugly in bed is to be removed, an improvement in the mechanical milking procedure must contribute. That the milking machine is an important part of normal farm life may be gathered from the following figures for 1940: The number of machines in use in New Zealand was 29,564, and these milked 1,445,756 cows, representing 84 per cent. of all cows in milk. Small herds are not usually machine milked, which accounts for the fact that only 41 per cent. of the Dominion's herds were machine milked, 46 per cent. of the herds being of fewer than 10 cows. Milking machines milked an average of 3.41 cows simultaneously and the average machine-milked herd consisted of 48.9 cows in 1940.

Stripping Question Not Yet Answered

Until the past few years, when labour shortage presented a very serious problem, most herds were hand stripped; that is, after the teat-cups of the machine were taken from the cow the remaining milk was removed by hand. This stripping process is an unpleasant one requiring extra time and labour in the shed. With the coming of the war great interest was taken in the non-stripping idea, which had been pioneered by a few farmers for quite a long time, but the question "Is stripping necessary?" has not been answered finally yet. Nevertheless an increasing number of successful dairy herds is being milked without hand stripping.

This problem of stripping is at the bottom of much of the research into the milking process being carried on at the Ruakura Animal Research Station and in other parts of the world at present. Before the question can be answered definitely the nature of the mechanism by which the cow lets down its milk must be understood.

Mechanical Problems

The milking machine owes its origin to the inventiveness of two Scotsmen, William Murchland of Kilmarnoch and Dr. Shiels of Glasgow, who in 1890 and 1895 respectively developed vacuum milkers which showed real promise. The final basic contribution, the invention of the double-chambered teat-cup which makes possible the application of a positive squeeze to the teats of the cow, was made almost simultaneously by Hulbert and Park, New York, and Gillies, in Australia, in 1902 and 1903 respectively.

Since then no basic invention really necessary to the principles of mechanical milking has been made. In the past 40 years there has been an immense amount of inventive activity, some of which has resulted in the improvement of the means of applying the basic principles so that the modern machine is convenient, reliable, and hygienic. Much inventive energy, however, has been spent in producing devices the value of which in the light of modern knowledge of the cow's mechanism is highly dubious.

Where a field of human endeavour is not guided by a sound theoretical knowledge it is almost certain to abound with ingenious devices many of which have no real use. This is particularly true in the field of mechanical milking.

Because of this a large amount of time at Ruakura is occupied in testing machine-milking methods and devices, using an automatic apparatus which plots volume of milk delivered against time on a graph. This supplies an exact record of how the cow is milking. During the past two seasons an exact record has been made of the response of a variety of cows to a wide range of adjustments, such as the level of vacuum used, the rate at which the squeezing action or pulsation is applied to the teats, and the nature of the squeezing action—sluggish or snappy, short or long. When the work is completed the essentials for an efficient mechanical milker will be able to be stated fairly definitely.

The making of such a recording apparatus is typical of the problems confronting all research workers. Knowledge is limited by the means available for obtaining it. In this case an instrument had to be made which would record the way in which the cow milked without altering the action of the machine, without changing in any way the procedure in the milking shed, and without requiring the presence of any extra people about the shed during milking. To study what was going on at the cow's teats a recording vacuum gauge had to be devised; to standardise milking procedure automatic timers and accurate milk-flow indicators were needed. Hence the research programme involves considerable work on the design and construction of measuring apparatus.

Mechanism of the Cow

Linked up with the work on the mechanics of the process is the work on the mechanism within the cow. Knowledge gained from observation of how the cow responds to different sets of conditions helps in formulating theories about how the mechanism for letting the milk down works. Following is a brief account of this process as knowledge stands at present.

Milk is secreted slowly throughout the day. It accumulates in the spongy structure of the secretory tissue of the udder, where it is retained by capillarity and from which only a portion can be obtained by passive draining, the remainder having to be squeezed out as from a sponge by mechanical force. This force is supplied by networks of tiny muscle fibres which when supplied with a special chemical —a hormone from the pituitary gland —will contract and force the milk down into the large ducts and the milk cistern of the udder. It is this forcing-down of the milk which causes the rise in pressure within the udder at the start of milking. There is reason to believe that this hormone which causes the milk to be let down is destroyed in the blood within a comparatively short time. This means that to get the most milk out of the udder the cow must be milked quickly.

MACHINE MILKING RESEARCH . . .

The milk let-down hormone is secreted into the bloodstream as a result of nervous stimulation of part of the small gland at the base of the brain—the posterior lobe of the pituitary gland. The natural stimulus which evokes the secretion of the hormone is the suckling of the cow by her calf —the application of tactile stimuli to the sensitive areas of the teats. Particularly with regular, modern machine milking, such actions as walking into the yards and being leg-roped and washed soon result in these conditions associated with milking becoming as effective as the stimulation of the teats in causing the milk to be let down.

In other words, the "let-down" reflex becomes "conditioned," a highly desirable situation which is strengthened by regular shed habits but weakened by irregularity or by accidents which upset the shed routine.

Physiological Problems

The second important phase of the work, the physiological aspect, concerns finding out how the posterior pituitary gland secretes the hormone: Is it a continuous secretion over a period, is it a sort of dose, or is there a possibility that it can be secreted in several doses? When the answer to those questions is known some progress will have been made toward finding out why some cows do not appear to respond to a non-stripping shed technique. When it is known why, toward the end of the season, some cows become strippy, it may be possible to prolong the lactation period. Work at Ruakura suggests, as yet only vaguely, that the loss of the ability to let down milk properly is part of the mechanism causing milk production to decline as lactation advances.

To solve these problems measuring apparatus is necessary. At present the rabbit is the best apparatus known and ways of estimating the ability of extracts from the pituitary gland to force milk down when injected into the cow are being explored by injecting them into lactating rabbits and measuring the time taken before the milk is let down—a phenomenon which is easily observed in the rabbit. The rabbit is a very useful animal, not only because the let-down action is easily seen, but because being small it requires only small doses of precious extracts and is easily handled in the laboratory.

The aim of this work is to discover not only the manner in which the hormone is secreted but what it is and where it goes. This information is essential for a complete understanding of the milking process, and with it will come answers to the awkward questions which arise when a farmer tries non-stripping and a few cows dry off prematurely, or when cows just do not give milk to the machine and have to be hand stripped.

Efficiency of Machines

A third aspect of the work is that relating to the efficiency of machine milking. How thorough must the milking be? How much strippings can be left behind without reducing a cow's output? To answer these questions, ways of recording pressure changes within the udder throughout the day and during the milking process are being studied. This problem is by no means simple. The aim is to measure pressure changes without pushing tubes up the teats—a procedure which often causes a flare-up of infection.

One of the strongest deterrents against non-stripping is the thought that the cow will not produce as much butterfat if she is not stripped. Field observations suggest that stripping does not increase production. The factors involved in this have still to be explored, for until the conditions limiting secretion in the cow are understood there can be no certainty.

As an outcome of the work at Ruakura, it is hoped that the farmer will be able to do away with the messy procedures of starting and stripping cows, and will have a simpler machine which is easier and quicker to clean. If that can be achieved, it will mean that knowledge of the physiological mechanism of the cow has been added to and a real contribution made toward bringing the comforts and convenience of city life to the man on the land.

Wastage in Silage

MAY BE DUE TO FAULTY SEALING

FARMERS with experience in silage making have often been puzzled to account for the variable amount of wastage on the top surface, and many have attributed excessive wastage to faulty sealing due to an insufficient covering of earth, or to the failure of the earth to bind together into a homogeneous air-proof layer. While no doubt the amount of wastage is also influenced by the class of the grass material used in topping off, the experience of Messrs. H. S. Langridge & Sons, Warkworth, indicates that imperfect sealing may be the main cause of this trouble.

Messrs. Langridge & Sons use a concrete silo sunk about 10ft. below ground level and projecting about 10ft. above the ground. The soil excavated in making the pit was used to form a ramp so that the silo can be conveniently filled from a truck.

Despite the care taken to heap on plenty of earth, when the silo was opened each season Messrs. Langridge were disappointed with the excessive quantity of surface wastage, as they are careful farmers who abhor any waste of valuable fodder. They decided that the wastage might be due to the failure of the dry earth to set and form an air-tight covering, and two years ago they tried out a new and unorthodox method of sealing. Instead of using earth, they used cow manure from the cowshed.

The cow manure used was about 3 weeks to a month old and just sufficiently moist to run together and form a homogeneous mass which would provide a good air-tight seal. This manure was spread over the surface to a uniform depth of 6 to 9in., being held in position by the concrete rim of the silo.

When opened up, the silage beneath was found to be in beautiful condition, with only about 2in. of waste as compared with up to 1ft. of waste in previous years. Using the method again last season, Messrs. Langridge again found a minimum of waste on the top surface and are now more than ever confirmed in their belief that the previous excessive wastage was due to imperfect sealing.

Messrs. Langridges' silo has a good water-tight roof, and the method adopted probably could not be applied to ordinary pit or stack silage. They are emphatic that the use of cow manure in the right condition involves less work than is required when using earth in the ordinary way. The covering of manure is easily removed when opening the silage and is in perfect condition for garden use.

Although the method described may have only a limited application, the experience quoted suggests that the excessive top wastage often found when opening out silage may be due to a defective seal. Messrs. Langridge & Sons are very capable and experienced farmers, and their unconventional system of sealing at least provides a possible explanation to the many farmers who are at times puzzled to explain this very common form of silage wastage. It is evident that the crowning of the silo is of real importance in silage making.

P. S. SYME,
Instructor in Agriculture, Warkworth.

SWEET CLOVER

DURING the past two years the growing of sweet clover by Messrs. McCaw Brothers, of Hakataramea, has created considerable interest among farmers throughout New Zealand. This article by T. A. Sellwood, Instructor in Agriculture, Oamaru, summarises the methods adopted in America, where the crop has been widely grown, and results secured up to the present at Hakataramea.

SWEET clover belongs to a group of plants the generic name of which is *Melilotus*. These are leguminous plants which, in the comparatively young stages, are superficially somewhat like lucerne. Three species have become well established as weeds or cultivated plants in many countries of the world. In New Zealand they have been present in various parts for the past 50 to 60 years, during which time they have come into periodic prominence either as weeds or as crop plants. These three plants are:—

Melilotus indicus, called "King Island melilot." It is a yellow-flowered annual plant growing about 2ft. high as a rule. It is a common coastal weed in some parts of New Zealand.

Melilotus altissimus, a biennial plant called "yellow sweet clover." It has yellow flowers but is otherwise very similar to white sweet clover. It is not common in New Zealand.

Melilotus alba, called "sweet clover," "white sweet clover," and "Bokhara clover." It is a biennial, white-flowered plant, reaching a height of 8 to 10ft. when in full flower. This is the plant that has been used to a considerable extent in America and which has been grown by Messrs. McCaw Brothers at Hakataramea. When it is young the stems and leaves are succulent, but as it matures the stems become hard, woody, and unpalatable. The root system is deep and carries a nodule formation similar to that of lucerne and most clovers.

American Experience

Summarising the literature from the United States of America, it may be stated that sweet clover is more drought resisting than red clover and lucerne, and that it is seldom winter killed. Sweet clover grows best on a good soil with a high lime content—in fact the name is probably derived from the fact that it thrives only on sweet soil and not from its taste, which is rather bitter. The same bacteria are required as for lucerne establishment, and therefore it is essential to inoculate the seed with lucerne culture before sowing.

Sweet clover being ploughed in with a 35 h.p. kerosene tractor turning three 16in. furrows.

Sweet clover does not yield as much leafage for grazing as does lucerne, particularly in its first year. In the second year, however, sweet clover can be grazed from early spring to late summer. When fed alone it is said to cause digestive troubles and to be unpalatable to livestock at the first feeding. In the second year it makes such rapid growth that heavy stocking is required to cope with the feed produced.

Because of uneven ripening, shattering of the seed, and the large size of the plant, no entirely satisfactory method of harvesting has been worked out, but the crop is sometimes cut with the binder, though that results in loss of seed. The combine harvester is also used. Sweet clover is reputed to make good hay in the first year, but the quality obtained in the second season is poor.

It is difficult to decide whether sweet clover is used more for pasturage or for soil improvement, but it is regarded in America as a useful dual-purpose crop. Its value as a soil improver lies largely in its ability to fix atmospheric nitrogen in the nodules on the roots—a feature common to most leguminous plants.

On the whole it is apparent from the literature available that sweet clover has been rated very highly in the United States for the past 30 years or so.

Results at Hakataramea

Some 13 years ago initial trials with sweet clover were carried out by Messrs. McCaw Brothers on 2½ acres of good land. The land was not limed or the seed inoculated. Results were poor, and the crop was finally grazed by stock.

In the spring of 1939, 3lb. of seed were sown on ½ acre of land which had previously been sown in lucerne. The results of the second attempt were very satisfactory, probably because the seed benefited from nodule bacteria established by the lucerne crop. This crop was grazed by cows for a while, and subsequently 40lb. of seed was saved.

In the spring of 1941 a further trial was sown on light, shingly land which did not require lime, but on this occasion the seed was inoculated with lucerne culture. The first season's growth amounted to only 6in., but during the following spring growth was rapid. The average height of the mature seed crop was 6ft. and in the better patches 9ft. The crop was difficult to harvest, and it had to be cut in the early morning while it was damp to prevent loss of seed by shaking.

The maintenance of soil fertility has always been a feature of the McCaw Brothers' farming practice. Before the use of sweet clover, crops such as lucerne and Montgomery red clover were used, some 500 acres of the latter being sown out. Today the area sown to sweet clover is from 400 to 500 acres, which is used for seeding, grazing, and green manuring.

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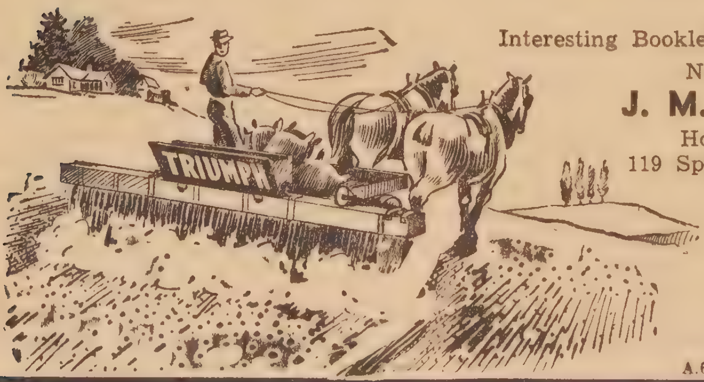

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Methods of Sowing

Methods of sowing sweet clover are:

1. Lightly drilling in the spring on autumn-sown wheat.
2. Sowing with rape in the spring.
3. Sowing in December on ground that was ploughed out of Montgomery red clover in October.

Sowing down with wheat is the most economical practice, as the seed-bed is already prepared and the drill coulters give the wheat a spring cultivation. In some seasons sweet clover may cause a peculiar taint in wheat if the crop is direct headed. This is caused by the sweet clover growing as high as the wheat—a condition more likely to occur if the season is wet—and the juice of the leaf soiling the wheat "berry" during threshing. In these circumstances the usual practice is to windrow the wheat. In a normal season in Hakataramea, however, the sweet clover would not attain such growth, and the wheat would be headed direct without possibility of tainting.

SWEET CLOVER AT HAKATARAMEA

Plants of sweet clover showing strong rooting system.

Fertilisers and Lime

Since the work on sweet clover was initiated by Messrs. McCaw Brothers further investigations have shown that liming and inoculation are essential to establishment, there being a marked difference in establishment when liming is omitted.

When sowing sweet clover McCaw Brothers now give an initial application of 1 ton of carbonate of lime an acre. One hundredweight of superphosphate is sown with the wheat, and the sweet clover sown in the spring will probably benefit from this fertiliser.

Green Manuring

Up to the present only a few acres of sweet clover have been ploughed in for green manure. This operation was carried out on a field which had grown two successive wheat crops before the sweet clover. At the time of ploughing in the over-all height of the crop was 8ft., and though there was a large bulk the ploughs turned the green material under with comparative ease, and also made an excellent job of burying it.

Arrangements are in train for a Departmental co-operative trial in which Montgomery red clover and sweet clover are to be tried out for green manuring. In the meantime there is little evidence of the value of sweet clover as a green mauring crop because the greater portion of Messrs. McCaw Brothers' crop has been held for seed production.

Grazing

The growth in the first year is normally from 12 to 14in., but the practice is to graze the first season's growth when the crop is 8 to 10in. high. In the second season the sweet clover may be grazed from early spring until the plant becomes too woody to be palatable. During the first year it should not be grazed too closely, but in the second season it makes rapid and prolific growth.

It is important that sufficient stock be put on the second season's growth to keep it well controlled. If it is not well controlled, the sweet clover becomes too rank and woody, and the plants then bloom, seed in the summer, and die. If it is kept closely grazed, it will continue to produce sweet, nourishing growth throughout the second season.

Messrs. McCaw Brothers consider that sweet clover can be used for fattening lambs. This opinion has been formed from observations extending over two wet seasons. No comparative information about lamb fattening on Montgomery red clover is available, as usually the first draft of lambs goes off toward the end of January as fats off the mothers. Any grazing obtained from Montgomery red clover between the spring and the beginning of November is mainly for control measures before the area is closed for seed production.

Ewes have grazed sweet clover during lambing from mid-September to mid-October. This grazing has been obtained only in the second spring, and particularly if the crop has been sown in the spring with wheat. Sheep grazing sweet clover have to acquire a taste for it, but lambs prefer sweet clover to rape.

Requirements of Crop

For the successful establishment of sweet clover the following points should be kept in mind:—

Lime: Like all legumes, sweet clover thrives well on sweet land; liming is necessary and heavy applications are required. Generally, ½ to 1 ton of lime should be applied before sowing. Where liming has been carried out previously 2cwt. of lime drilled with the seed is beneficial.

Fertiliser: Sow 1cwt. of superphosphate with the crop; if convenient, it is advantageous to pre-drill it. That is achieved when sweet clover is sown after autumn-sown wheat, it being the practice for farmers to sow 1cwt. of superphosphate with the cereal crop.

Inoculation: Sweet clover must be inoculated. For successful establishment it is just as necessary to inoculate sweet clover as it is lucerne. The same inoculum, obtainable through merchants, is used.

Preparation of seed-bed: A fine, firm, compact seed-bed is required. Sow as shallow as possible. The seed is sown at the rate of 6 to 10lb. an acre; it may be mixed with 2cwt. of lime and sown through the manure box or through the rape box of the drill.

Though sweet clover is found in many parts of New Zealand, it has made little headway as a farm crop up to the present. The recommendations made are only tentative, and are based on results secured by Messrs. McCaw Brothers, to whom thanks are extended for the information in this article. As additional information becomes available from Hakataramea and other districts where sweet clover is now being grown it will be published in the "Journal."

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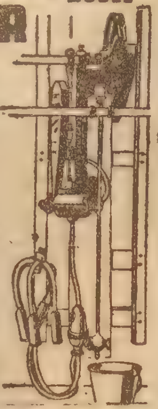

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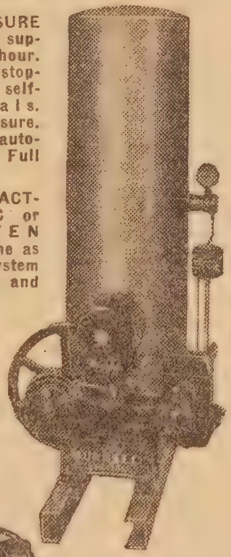

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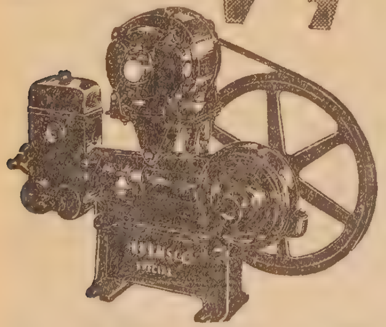

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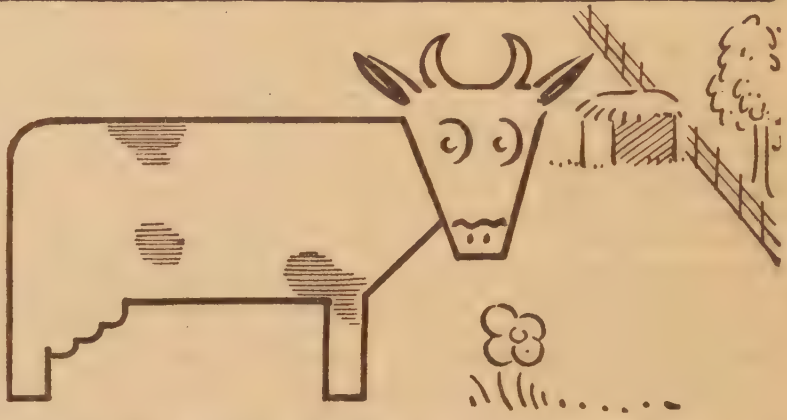

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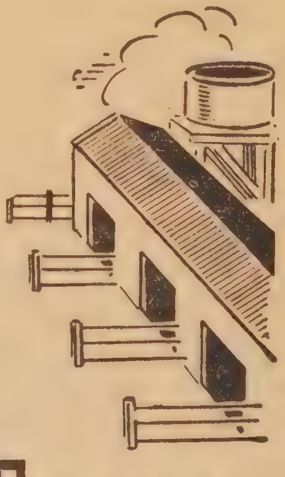

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HARVESTING, PACKING, AND MARKETING STONE FRUIT

By S. FREW, Orchard Instructor, Blenheim.

WHEN by a combination of efficient orchard practice and favourable weather a good crop of stone fruit has been matured, the successful harvesting, packing, and marketing of it are the best gauge of each season's success or failure. The importance of attending to these operations with the highest degree of efficiency therefore cannot be over-stressed.

THE perishable nature of practically all stone fruits necessitates the greatest care during harvesting, packing, and transport to market. Stone fruit must be handled literally like eggs if the produce is to reach the market in good condition. Careless handling causes stem punctures, undue pressure with fingers causes bruising, and long finger nails will cut the skin and start rapid decay. In America gloves are frequently worn by operators, and this practice has much to commend it when dealing with high-quality lines.

Judging Maturity

To determine the correct stage of maturity for picking requires specialised knowledge on the part of the grower. Fruit intended for more distant markets requires to be picked in a firmer condition than that for nearer markets. The tendency of some growers in recent years appears to have been to err on the safe side in this respect, with the result that many immature lines have arrived on the market and in the shops, the fruit being small, green, and unattractive. With this class of fruit transit losses through brown rot and wastage are undoubtedly few, but the indirect loss in value must be considerable in a season of normal supply and demand.

Apricots for distant markets should be picked when the ground colour is turning to light yellow or straw.

Peaches should be harvested when the fruit is fully developed and the flesh still firm. Between development to full size and full ripeness peaches increase in sugar content, and during that period it is estimated that the weight of fruit increases by more than 12 per cent. That indicates the importance of permitting peaches to remain on the trees as long as possible and yet arrive on the market in good condition. Not only does the grower gain by an increased weight of crop, but the consumer receives a higher-quality fruit.

Cherries, especially early soft-fleshed varieties, should be picked while still very firm. Early varieties, which when tree-ripened are dark red to black, should be picked when they have attained a good red colour and are fairly sweet. The later varieties, which will carry in more matured condition,

PACKING AND TRANSPORTING STONE FRUIT

Care in packing will avoid damage during loading and transport.

should be a dark or purplish red before being harvested. White or yellow varieties should be harvested when they have attained a good typical colour and are fairly sweet.

Care in Picking

Stone fruit picked at the desirable stage of maturity will readily come off with a slight upward twist of the hand, but care should be taken not to inflict undue pressure on the fruit. Bruising during picking will result in early development of brown rot and soft decay. To avoid bruising, light picking-tins which are rigid and of moderate capacity are preferable to the large canvas picking-bags used for pip fruits. The fruit should be carefully placed in the picking receptacles and never thrown or dropped in.

Every precaution should be taken to prevent spread of brown rot, and infected fruit should not be allowed to come in contact with sound fruit. If necessary, the picking-tins should be regularly sterilised.

Cherries should be picked with the stems attached or the skin will be broken and the fruit will decay during transport to the market. While ensuring the detachment of the stem, care must be taken not to break off the fruit spur, which should remain as a potential production unit of the tree for future seasons.

Sizing and Grading

With the possible exception of cherries, all stone fruit requires sizing as a prerequisite to good packing, and a sizing machine over which the fruit passes to the packer is a valuable asset. Fruit put over the machine should be of firm maturity and moderate size, and the machine and bins should be kept free from dirt and grit. For large fruit of greater maturity and higher quality careful hand treatment is preferable.

Though size is one of the principal factors regulating the market price, grading for quality also influences values. Consignments packed in grades according to colour and amount of blemish on individual fruits will command attention and a price commensurate with the quality. First grade should consist of well-formed, well-coloured fruit typical of the variety and free from pests and diseases, and any blemishes should be very slight. Second- and third-grade fruit may be of a slightly lower standard, but should not contain defects which may cause the fruit to decay or make it unattractive to the purchaser.

Recommendations for Packing

No. 6 standard case is recommended for packing firm, graded fruit, and the diagonal pack should be adopted to ensure the minimum of bruising. The cases should be lined with clean white paper. Correctness in height is necessary to avoid damage to the fruit during lidding. For large-sized, high-quality, mature fruit the use of trays as containers is recommended. Attractively displayed in coloured paper shavings or wood wool, high-quality fruit should be packed in one-layer trays either crated or wired together in threes. This method enables the fruit to be sold in smaller quantities, and with the absence of tight packing the risk of bruising is lessened considerably.

In packing cherries care should be taken to fill the corners of the box and to see that the minimum net weight is contained in each package. "Facsing" of cherries can be done with advantage by placing the first layer of fruit in the box with the stems toward the packer, an effort being made to "row" the fruit as uniformly as possible; the remainder of the box is filled without any definite arrangement, but taking care to fill the corners and to have no fruit extending over the sides. The bottom is then nailed on and the box reversed for labelling. The first layer of faced fruit becomes the top layer and presents a pleasing appearance when the box is opened.

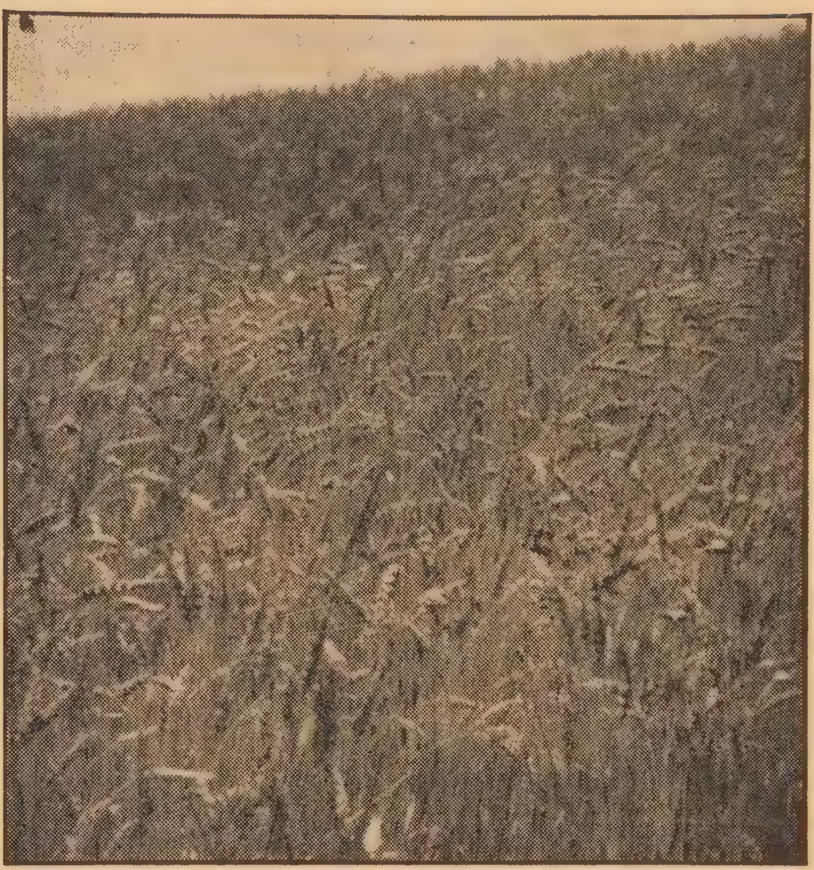
The perishable nature of stone fruit necessitates the greatest care in handling during transport.

MANURING OF WHEAT WITH PHOSPHATES

Trials with Super & Serpentine Super

By P. B. LYNCH, *Crop Experimentalist, Wellington.*

THE drilling of phosphatic fertilisers with wheat has become almost universal in wheat-growing areas of New Zealand. The quantity normally applied is 1cwt. of superphosphate an acre in Canterbury and 2cwt. in Otago and Southland and in the North Island. However, experimental evidence suggests that this higher rate is unnecessary in the majority of cases.



WITH the introduction of serpentine superphosphate information was required as to the merits of this material in comparison with superphosphate as a wheat fertiliser, and a large number of experiments have been laid down since 1941. Before proceeding with a critical examination of 20 of these trials it is desirable to describe the manner in which these wheat experiments are conducted and the variations in responses to superphosphate which have been measured since the trials were commenced.

Co-operative Wheat Experiments

These trials are laid down on various farmers' properties throughout wheat-growing areas. In the majority of cases they are on a "randomised block" layout, each treatment being replicated or repeated in a number of plots throughout the trial. The layout is designed in such a manner that statistical analysis of yields enables one to give the probabilities that the differences between treatments as measured are really due to the different treatments and not to other sources of variation such as soil and various errors associated with the experiment. When the probability that the treatment effect is a "real" one is at least 19 to 1, the effect of or response to that treatment is said to be "significant." Similarly differences between treatments are "significant" or "not significant."

Each plot is usually 2 chains long and 7 coulters wide and is drilled with special experimental drills sowing 7 coulters. The total area of the experiment is about half an acre. At all times the trials are under exactly the same influences that are affecting the main crop in the farmers' paddock in which the experiment is located, and the results are what the farmer would obtain if he used the treatments used in the trial.

Before dealing with the superphosphate-serpentine superphosphate comparison it is of interest to examine the responses to 1cwt. of superphosphate an acre that have been secured on wheat manuring trials since they were first conducted in 1928-29:—

Seasons in which trials were conducted.	Number of trials harvested.	Yields in bushels an acre. Difference 1cwt. superphossphate from "No Manure."	
		Range of differences.	Average response.
1928-29	15	1.2 to 13.8	6.6
1929-30	32	0.4 to 7.0	3.8
1930-31	27	0.3 to 7.6	3.1
1931-32	21	2.1 to 12.7	5.1
1932-33	3	2.0 to 7.6	4.5
1933-34	8	0.3 to 6.8	2.4
1934-40	10	—1.7 to 7.2	1.8
1940-41	7	0.0 to 5.8	2.3
1941-42	6	—0.1 to 2.9	1.0
1942-43	11	—2.6 to 6.1	1.4
1943-45	5	—2.2 to 3.1	1.0
1945-46	5	0.3 to 2.3	1.4
Totals and averages	150	—2.6 to 13.8	3.4

The table below shows that there is a definite trend for responses to superphosphate to decrease over the last 15 to 20 years. This trend is probably due to a gradual build-up in fertility of the wheat-growing soils during this period. There is strong practical evidence for believing that such an increase in fertility has been brought about during the period the land is in grass. The productivity and stock-carrying capacity of such pasture

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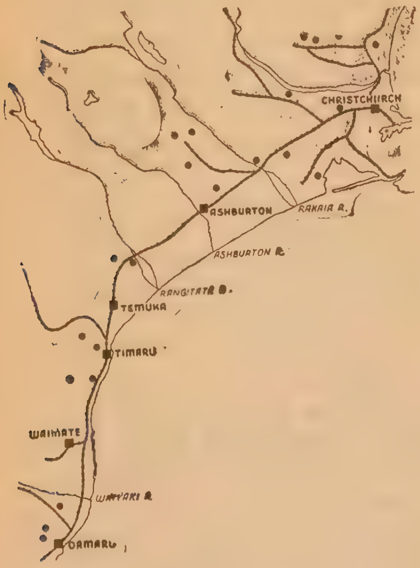
has been greatly improved by topdressing with lime and fertilisers and by the use of improved and more persistent strains of grasses and clovers.

Consequently the type of pasture ploughed under today is, on the average, greatly superior to that ploughed under 15 years ago, and the phosphate content of the soils is also higher. There is not the same need for applying fertiliser with wheat, which is a crop that does not demand as high a level of available phosphorus compounds in the soil as grass and, notably, brassica crops (swedes, rape, etc.). As an insurance against a possible deficiency, however, the use of 1cwt. an acre of a phosphatic fertiliser with wheat is still recommended. The cost of this material is about 4s. an acre and is met by an increase of much less than a bushel of wheat an acre.

There remains the possibility that the varieties now used in the trials (mainly Cross 7) are not as responsive to fertilisers as were the varieties used several years ago. To test this assumption three trials were laid down last year using the varieties Cross 7 and Solid Straw Tuscan. In no case was there any significant difference between the response of the two varieties to fertiliser.

In view of the present relatively low responses to superphosphate, it is necessary to view with caution apparently small differences in effect on yields between superphosphate and serpentine superphosphate, and this must be borne in mind when considering the following survey.



Location of wheat manurial trials is marked with a dot.

[*Map by Lands and Survey Department, Wellington.*

WHEAT MANURIAL TRIALS

Two adjacent plots in a standard wheat manurial trial.

COMPARISON OF SUPERPHOSPHATE WITH SERPENTINE SUPERPHOSPHATE ON WHEAT

The comparison in all cases is between 1cwt. an acre of each fertiliser, which means that there is about one third more phosphorus applied an acre in the superphosphate treatment than in the serpentine superphosphate treatment. Typical analyses of superphosphate give a total phosphoric acid content of 21 to 23 per cent. and of serpentine superphosphate of 15 to 17 per cent. The first question that arises is, therefore, whether this smaller amount of phosphoric acid would cause a significant reduction in yield if it was applied as superphosphate. An analysis is therefore given of the results of sixteen of the trials concerned where one of the treatments was the "minimum amount of superphosphate that the drill would sow." In most cases this is about 90lb. an acre, in which case about one quarter less of the phosphoric acid is applied than is applied when 1cwt of superphosphate is sown.

Details of the trials concerned are given in the table below. Where the "superphosphate minimum" treatment was included the trials are marked with an asterisk.

Consideration of the 20 trials shows that:—

(a) The mean response to 1cwt. of fertiliser an acre (superphosphate or serpentine superphosphate) is **1.2 bushels an acre.**

(b) The mean difference in favour of superphosphate in comparison with serpentine superphosphate is **0.4 bushels an acre.**

This mean difference in favour of superphosphate is, however, **not significant**, whereas the mean response to fertiliser is just significant. This means that, although on the average superphosphate shows a slight superiority, this difference in individual trials is not consistent. In fact, the comparison in such cases shows a range from 2.07 bushels an acre in favour of superphos-

Experiment Number.	Name of farmer co-operating.	Date trial sown.
*16/3/1324	H. G. Chamberlain, Leeston	7/5/41
*16/3/1325	E. G. Wright, Dunsandel	13/5/41
*16/3/1371	M. E. Jenkins, Courtenay	30/6/42
*16/3/1329	F. Dawson, Fernside	30/5/41
*16/3/1367	C. G. Sutherland, Rangiora, Springbank	8/6/42
*16/3/1368	W. J. McMillan, Rangiora	11/6/42
*16/3/1403	C. E. Brown, Oxford	19/6/43
*16/3/1331	J. F. Langley, Somerton	9/6/41
*16/3/1332	McDonald and Rooney, Lyndhurst	4/6/41
*16/3/1361	W. K. Wilson, Methven	12/6/42
*16/3/1363	Mt. Harding Estate, Methven	29/6/42
16/3/1441	W. Forsythe, Ealing	9/6/45
*16/3/1360	F. R. Clarke, Waitawa	5/6/42
*16/3/1365	A. D. Bishop, St. Andrews	18/6/42
*16/3/1366	Gleniti Golf Course, Timaru	8/6/42
*16/3/1402	R. G. Wallace, Geraldine	8/6/42
*16/3/1405	A. D. Bishop, Lyalldale	4/8/43
16/4/980	G. Stevenson, Weston	27/5/40
16/4/1039	G. Stevenson, Weston	26/5/40
16/4/1165	R. G. Paton, Pukeuri	23/8/45

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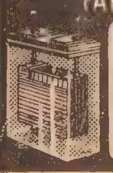

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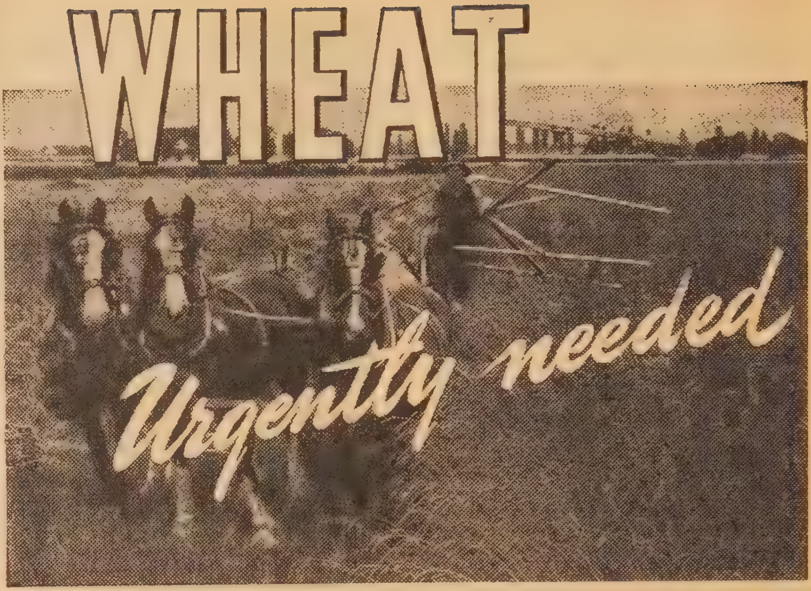

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MANURIAL TRIALS . . .

phate to 1.44 bushels an acre in favour of serpentine superphosphate.

The next step was to investigate the possibility that the trials could be grouped in some fashion so that in some group or groups the differences were sufficiently consistent to enable them to be termed significant. This grouping was made into

(i) districts and
(ii) soil types.

(i) Districts:

The trials were divided as follows:—

North Canterbury	4 trials
Christchurch ..	3 „
Mid-Canterbury	5 „
South Canterbury	5 „
North Otago ..	3 „

No significant difference in favour of either superphosphate or serpentine superphosphate could be found in the above districts, the range being from 0.4 bushels an acre average in favour of serpentine superphosphate in North Canterbury to 0.8 bushels an acre in favour of superphosphate in Christchurch.

(ii) Soil Types:

Trials were located on the following soil types:—

Heavy clay loam	9 trials
Silt loam ..	4 „
Light and stony	3 „
Medium loam ..	3 „

Again there is no significant difference in favour of either fertiliser, the range being from 0.2 bushels an acre average in favour of serpentine superphosphate on the silt loam soils to 0.7 bushels an acre average in favour of superphosphate on the heavy clay loam soils. Unfortunately, in the absence of a more definite classification of these soils into soil types at the time the experiments were conducted, it is impossible to be more specific in their description.

The next method of approach was to test the assumption that the mean response to fertilisers in any trial was reflected in the size of the difference in response between superphosphate and serpentine superphosphate. One would expect this difference to be greater in trials where a considerable response to fertilisers was obtained than where the response was small. This was found to be significantly the case. The relationship between the mean fertiliser response and the difference as above could then be found. The various individual differences as shown by the trials between the two phosphatic fertilisers were then adjusted so that the effect of varying fertiliser response was eliminated. On examining these adjusted differences it was still found that the mean difference between superphosphate and serpentine superphosphate did not become statistically significant.

All the foregoing material shows that 1cwt. an acre of serpentine superphosphate is as efficient a fertiliser for wheat as 1cwt. an acre of superphosphate. The question that arises is whether a smaller quantity of either fertiliser will give results equivalent to 1cwt. an acre of superphosphate. As indicated above, 16 of the trials considered had a treatment of about 90lb. of superphosphate an acre (the minimum quantity the average drill will sow), and the following analysis compares this dressing with 1cwt. of superphosphate an acre.

	bushels an acre
Mean yield of wheat on "no fertiliser" plots	36.6
Mean yield of wheat on "superphosphate minimum" plots	37.3
Mean yield of wheat on "superphosphate 1cwt." plots	38.0
Mean yield of wheat on "serpentine superphosphate 1cwt." plots	37.8

From these mean yields the following conclusions are drawn:—

1. Considering each treatment versus no fertiliser:—

(a) Both superphosphate 1cwt. (1.4) and serpentine superphosphate 1cwt. (1.2) give a significant increase over no fertiliser.

(b) Superphosphate minimum does not give a significant increase over no fertiliser.

2. Considering superphosphate 1cwt. versus serpentine superphosphate 1cwt.:—

The difference 0.2 in favour of superphosphate is not significant.

3 Considering superphosphate minimum versus other treatments:—

(a) Superphosphate 1cwt. gives an increase over superphosphate minimum of 0.7, which just fails to reach significance.

(b) Serpentine superphosphate 1cwt. gives an increase over superphosphate minimum of 0.5, which is not significant.

Hence both superphosphate 1cwt. and serpentine superphosphate 1cwt. give significant increases over no fertiliser; whereas 90lb. of superphosphate, which contains about the same amount of phosphoric acid as 1cwt. of serpentine superphosphate, does not give a significant increase over no fertiliser. Thus it can fairly be said that per unit of phosphoric acid serpentine superhosphate is at least as good as superphosphate as a wheat fertiliser.

It is unfortunate that the responses of wheat to phosphatic dressings as measured by the trials are small, and this fact restricts the value of the results secured. Nevertheless the trials prove conclusively that serpentine superphosphate, weight for weight, is as good a fertiliser for wheat as is superphosphate. The evidence also suggests that it is not advisable to drill less than 1cwt. an acre of either fertiliser when sowing the wheat crop.

◆

SHOW DATES

January 1—Nuhaka A. and P. at Nuhaka.
January 10, 11—Wairoa A. and P. at Wairoa.
January 11—Blueskin A. and P. at Waitati.
January 17—Waikouaiti A. and P. at Waikouaiti.
January 24—Palmerston-Waihemo A. and P. at Palmerston.
January 24, 25—Taumarunui and District A. and P. at Taumarunui.
January 25—Helensville A. and P. at Helensville.
January 25—Waihi A. and P. at Waihi.
January 29—Tauranga A. and P. at Tauranga.
January 29—Marton A. and P. at Marton.
January 30, 31—Hawke's Bay Ram Fair at Napier.
January 31, February 1—Horowhenua A. and P. at Levin.
February 1—Waipukurau A. and P. at Waipukurau.
February 1—Katikati A. and P. at Katikati.
February 1—Clevedon A. and P. at Clevedon.
February 1—Golden Bay A. and P. at Takaka.
February 1—Rodney Agricultural Society at Warkworth.
February 4, 5—Feilding A. and P. at Feilding.
February 5—Te Puke A. and P. at Te Puke.
February 6, 7—Feilding Ram Fair at Feilding.
February 7—Waiwera A. and P. at Waiwera.
February 7, 8—Taranaki A. and P. at New Plymouth.
February 8—Woodville A. and P. at Woodville.
February 8—Te Awamutu A. and P. at Te Awamutu.
February 8—Hukerenui A. and P. at Hukerenui.
February 11, 12—Dannevirke A. and P. at Dannevirke.
February 12—North Kaipara Agricultural Association at Kaipara.
February 13—Dannevirke Ram Fair at Dannevirke.
February 14, 15—Franklin A. and P. at Franklin.
February 14, 15—Pukekohe A. and P. at Pukekohe.
February 15—Pahiatua A. and P. at Pahiatua.
February 15—Whakatane and Rangitaiki A. and P. at Whakatane.
February 19—Opotiki A. and P. at Opotiki.
February 19, 20—Ohura A. P. H. and I. at Matiere.
February 21, 22—Masterton A. and P. at Masterton.
February 21, 22—Auckland Metropolitan A. and P. at Auckland.
February 24, 25—Masterton Ram Fair at Masterton.
February 26, 27—Rangitikei A. and P. at Taihape.

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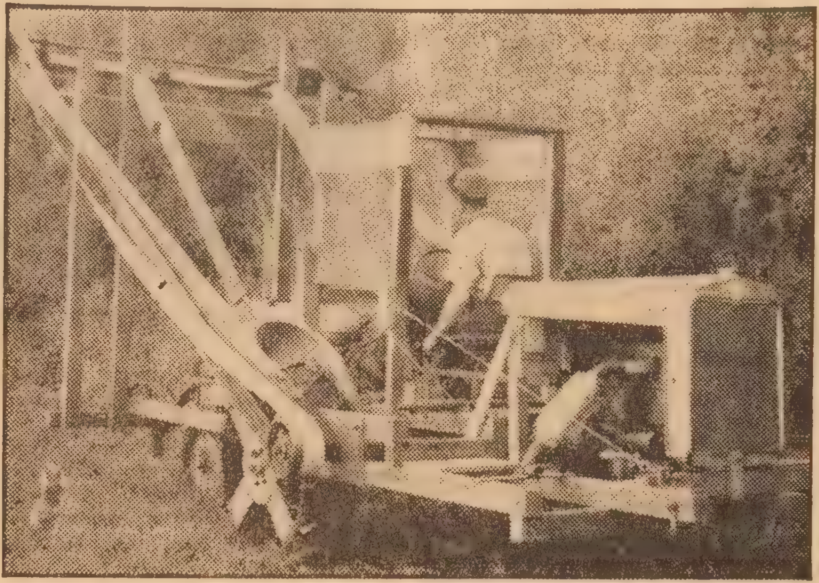


Boxthorn cutter in action, showing operator and car engine for power drive.

THE many miles of African boxthorn hedges, which serve as stock-proof subdivision fences and as farm shelter, are one of the outstanding features of the landscape of Taranaki Province. Especially in South Taranaki the fertile, light, volcanic, and free-draining soils are so suited to its growth that almost everywhere boxthorn hedges provide all the farm subdivision fences. Boxthorn, moreover, is the only stock-proof hedge plant which will withstand the spray-laden winds that frequently come in with gale force from the Tasman Sea along this coast.

THIS hedge plant may be seen at its best on the coastal road from Patea to Opunake and inland from Hawera to Normanby, thence to Okaiawa, Kapuni, Auroa, and Pihama. Sometimes it appears as a neatly-trimmed roadside or subdivision hedge 4 to 5ft. high, or within the farm and on the boundary as strong, rugged shelter hedges 8 to 15ft. in height.

Similar to Gorse-cutters

In South Taranaki boxthorn grows rapidly, and being an evergreen its growth is continuous throughout the year. Some idea of its development is shown by the fact that a new hedge planted with yearling or two-year-old seedling plants will provide a stock-proof fence after about three years' growth. If growth is allowed to continue uncut it will soon extend into a tall, dense mass of branches covered with strong prickly thorns from 1 to 1½in. long. In 10 to 15 years boxthorn will produce a massive shelter hedge 12 to 15ft. wide and about the same height.

To keep boxthorn hedges in check by hand cutting is costly and laborious. On many farms only roadside hedges receive annual attention; on the majority of farms sections of the subdivision hedges are cut each year in rotation and the boundary hedges rarely, if ever, are cut at all. A boundary boxthorn hedge with a base more than half a chain wide is not uncommon. Even for moderate control, hand cutting with a slasher involves many man-hours of hard work each year, and is a costly item in the wage bill.

Rapid and Continuous Growth

Several mechanical devices for hedge cutting were under trial before the war, but generally they were only partially successful. The labour difficulties of the war period quickened the incentive to produce efficient cutters, and now a number of reliable machines are successfully operating in the Taranaki district.

Though the machines at present in operation vary somewhat in their construction and efficiency (and are constantly being changed for the better), several of these machines are now so effective that the irksome problem of boxthorn cutting can be counted as having been solved.

Development of Machines

In principle, all machines are modelled on the same lines and are similar to the gorse-cutting machines developed in Canterbury. Boxthorn cutting, however, presents some special problems. For instance, the height and width of many of the hedges is much greater than that of any gorse hedge, necessitating a much bigger machine. The size and toughness of the branches calls for sturdier construction and modification of the cutter bar and blades.

In general, the machine is built on a platform constructed round the tractor and rigidly attached to it. From the forward end of this platform two uprights carry the drive shaft for the cutter bar, which is suspended from an adjustable boom raised or lowered by a winch fixed to the rear of the platform on one side. On the other side is the drive mechanism, usually a belt driven by the tractor pulley or a special engine mounted on the platform.

The chief variations in machines are found in the construction of the platform and the arrangements for driving the cutter bar. With the bar suspended at the end of a relatively long arm there is considerable end thrust when the cutter bar is revolving at 1,800 to 2,000 revolutions a minute, especially when branches up to 3in. in diameter are being cut. The strength and balance of the platform are therefore of considerable importance, and the structure must be sufficiently rigid to prevent undue loss in transmitting driving power to the cutter bar.

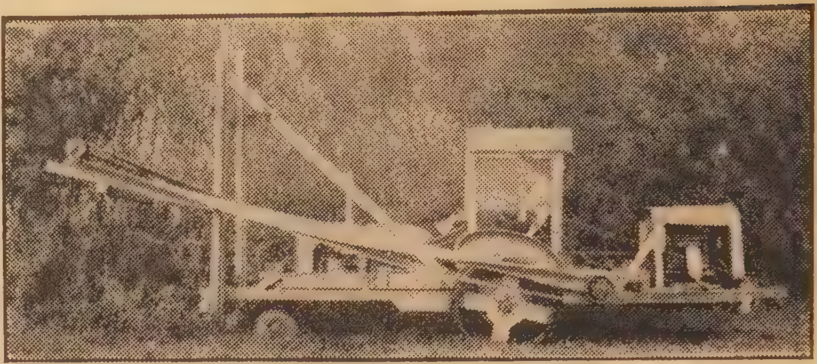
Because of the very heavy work asked of the machine in dealing with some of the massive boxthorn shelter belts, a separate engine for driving the cutter bar is preferred. When the tractor pulley is used it is not possible to reduce the forward speed of the machine while maintaining the speed of the cutter. In dealing with very heavy growth it is often necessary to reduce the forward movement to a minimum while the cutter bar slashes at tough, resistant branches. For ordinary hedge trimming direct drive from the tractor side pulley is quite satisfactory, but such machines have difficulty in dealing with the really old, overgrown hedges which on many farms are developed as main shelter belts.

Efficient Home-made Cutter

On the farm of Mr. A. E. Luscombe, Kapuni, a typical South Taranaki farm (see "Journal of Agriculture" for April, 1945), practically all the fences on the 174 acres are of live boxthorn. There are more than 6 miles of such hedges, and the annual expenditure to keep them in reasonable order by hand cutting has been a considerable item in the farm budget. Mr. Luscombe was one of the first to take up the problem of designing a machine for this work, and he has developed an efficient plant.

Construction Details

Platform: A strong wooden frame is built round the tractor and rigidly bolted to it. The tractor thus forms a pivot on which the machine can be swung and driven in any direction. The tractor can be driven out of the framework and readily detached from the machine when required for other work. The tractor used is a 17-horse-power model on steel wheels, and the platform is 24ft. long by 8ft. wide, made from good seasoned 4in. x 3in. rimu with special hardwood members where extra strength is required.



Side view of machine cutting a boxthorn hedge. Note tractor wheels providing central pivot.

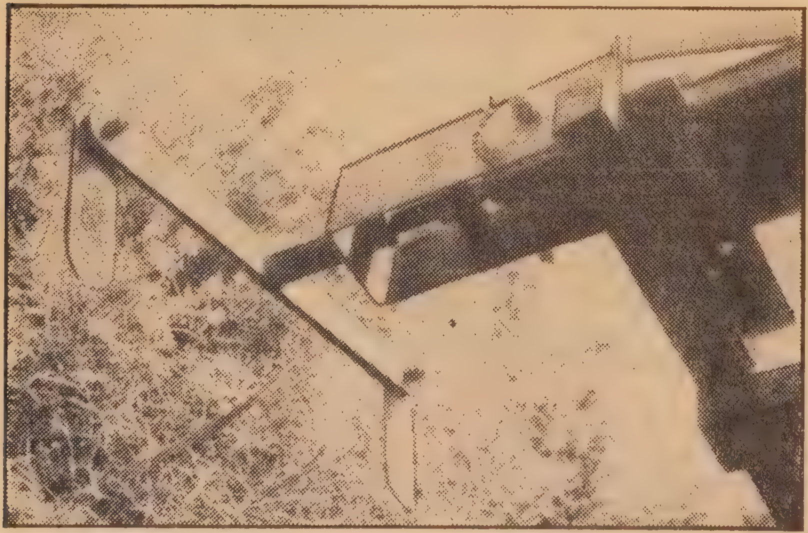
Cutter bar attachment: The cutter bar and drive mechanism is carried forward of the tractor on two 17ft. stays, one on either side of the tractor and fastened at the rear to sockets on the power take-off shaft. The forward ends are adjustable up and down for height of cutting on two strong uprights rigidly stayed to the frame. By means of a winch the stays carrying the cutter bar and shaft can be raised or lowered to any position; the machine can cut down to the ground or to a height of 15 or 16ft.

Drive shaft: A 9ft. steel shaft is attached to a crossbar at the end of the two arms by three brass bearings. At one end is the pulley for a belt drive and at the other is the cutter bar, driven by a worm drive. The attachments at either end of the drive shaft are interchangeable so that the cutter can be used on either side of the tractor to deal with corners and cutting past power poles.

Cutter bar: A strong flat steel bar about 4ft. long is attached to the end of the drive shaft by a universal joint which can be locked to hold the bar in any position from perpendicular to an angle approaching the horizontal. Most side cutting is done with the bar perpendicular, but to trim the top of a hedge the bar can be fixed to revolve almost horizontally, giving a slightly-sloping cut to the top.

Blades: The cutting is done by two steel knives, 11in. long and 3in. wide, suspended on a short stud on the cutter bar and free to revolve on a special brass bearing fitted into the end of each blade. This arrangement saves breakages and wear on the blades. With the cutter bar revolving at 1,800 to 2,000 revolutions a minute, the blades are held in line with the bar by centrifugal force, and they hit the hedge branches with considerable force. Being hinged, however, and free to revolve, they bend back if the first stroke is not sufficient to cut through the stem, coming back into position again for the next stroke.

Power drive: Power for the cutter is supplied by a second-hand 20-horse-power car engine mounted on a platform at the back of the frame. The gearbox is included, and in second gear the engine gives the necessary speed to the drive. The driving pulley is mounted on a short shaft from the engine, and the 5in.-wide drive belt to the pulley on the end of the cutter arm shaft is 17ft. long, giving smooth, positive drive without loss of power. The throttle is operated from the tractor-driver's seat.



Propellor blade shaft with swivel-connected steel knives in position for cutting.

Winch and guard: A small hand winch operates a light wire rope which extends over wooden uprights to the top of the cutter bar arm for raising or lowering the cutter bar. To protect the operator from flying splinters and hedge cuttings, a strong cage, covered with close-mesh, heavy wire netting has been built over the driver's seat and steering wheel.

Cost of unit: All the materials for the cutter, including the separate engine, framework, shafts and pulleys, and a special heavy duty belt of the best quality, cost about £100.

Cutting Operations

No two boxthorn hedges are alike, varying considerably in height, width and density according to age, soil fertility, aspect, and control methods used in the past. To handle efficiently all the conditions met with a machine must be versatile. That made by Mr. Luscombe can tackle any type of hedge cutting likely to be met with.

The main variations in method are in the number of cuts required, the number and type of cutting blades which can be used with advantage, and the speed at which the tractor can be driven. In the case of an average strong boxthorn hedge of 6 to 8 years growth, with a height and width of 10 to 12ft., about five cuts would be required for a thorough job. The procedure would be:

First cut with the blades clearing the ground by 1 to 2ft. The tractor is driven somewhat wide of the hedge and the heavy overlap toward the bottom of the hedge is cut away.

Second cut at about the centre of the hedge above the first. This cut would be closer than the first and would clear from about 2ft. from the ground up to 6 or 7ft. high.

Third cut with the blades striking right down to the ground, clearing the base of the hedge.

Fourth cut with the tractor driven slightly closer now that the bottom of the hedge is cleared. This cut is taken above the centre cuts.

Fifth cut right to the top on a slight bevel or with the arm set to cut the top off fairly squarely, whichever is desired. Where hedges are also main shelter belts the top cut is kept vertical so that the full height of the shelter remains.

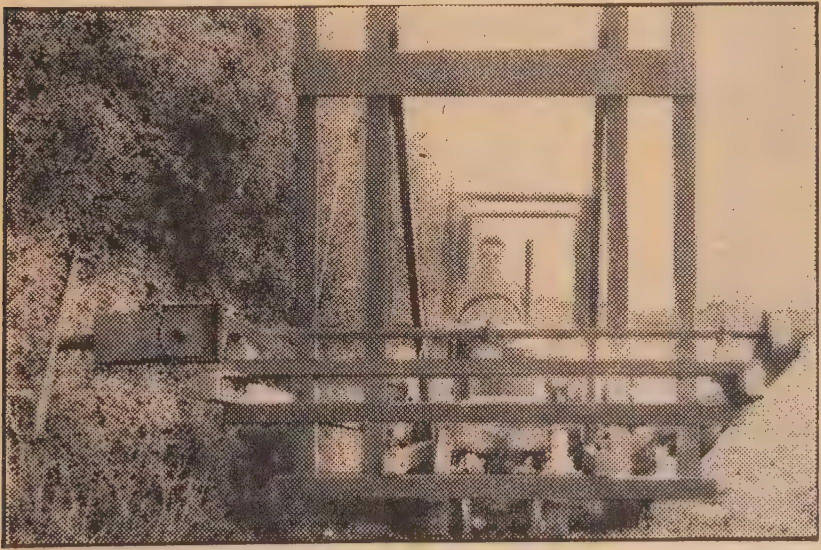
At each cut a man follows the machine forking the cut material about 10ft. back from the hedge. In contrast to the tangled mass of material which has to be moved when such a hedge is cut by hand, the short cuts by the machine leave the material loose and relatively easily handled. The cuttings are pushed into heaps by a tractor sweep, ready for burning.

Great Reduction of Cost

Local experience indicates that costs can be estimated on the basis of the number of cuts required, these being as follows:

Hedge growth.	No. of cuts. (one side)
1 to 3 years	2
3 to 6 years	3
6 to 8 years	4 or 5
Over 8 years	Up to 10

Working on a hedge 10 to 12ft. high, which had not been cut for 6 or 8 years, the machine cut to a clean, straight side an average distance of 6 chains an hour. Hired at a cost of £2 an hour, such a machine would do for approximately 7s. a chain work which has been costing at least 25s. a chain in the district. Moreover, labour for this type of work is becoming more and more difficult to secure.



Front view showing steel drive shaft and cutter bar attachment.

Cutting Finished Early

This mechanical cutter has proved so effective on this farm that the 300 chains of boxthorn hedges of all types (mainly well overgrown because of lack of labour during the war) were cut this season immediately after harvesting the hay. All the work was completed early in the autumn, when good clean burns of the rubbish were possible.

Hedges cut at that time of the year make sufficient fresh growth to give good wind-proof shelter for the stock in the winter. Late-cut hedges, on the other hand, are still open and draughty when the cold weather comes. Most farmers realise this, but they have had to continue cutting much too late; even then on few farms has the work been kept up to date by hand cutting.

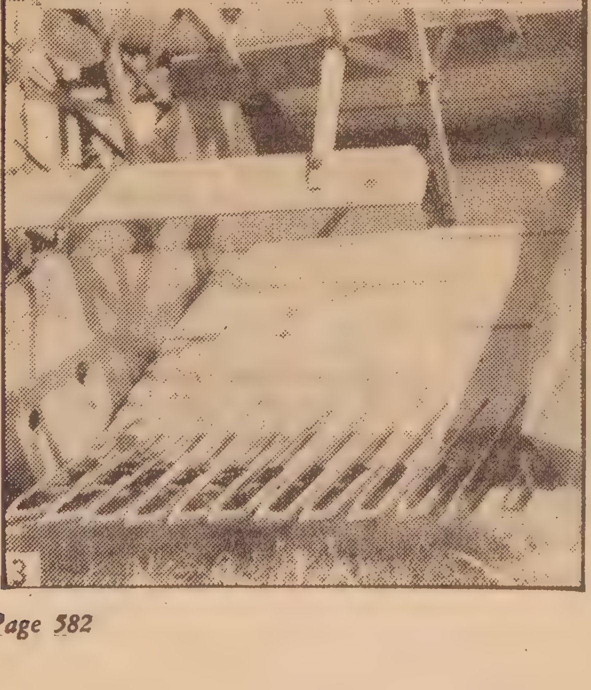
This season the machine has had to tackle many very heavy hedges to catch up with arrears of work. Now that this heavy work has been done and hedges are cut to a straight line again, the work will be comparatively light and the machine is expected to complete the hedge cutting on the farm each year in about 50 hours.

Use of Tractor Sweep

With the introduction of the mechanical cutter, another operation which has absorbed many man- and horse-hours on Taranaki farms in the past has also been mechanised. The 17-horsepower tractor is fitted with an all-steel hay sweep, and the boxthorn, after being forked back from the hedge during cutting, is easily swept out into the paddock on to the fires. Using the tractor sweep for this operation has a considerable advantage over forking and dragging the material with horses, not only in saving time but because the sweeping compresses the material into tight heaps which burn much more readily and cleanly than the loose material which results from shifting the cuttings by hand. Further, the material can be pushed right into the fire with the sweep, reducing the area of ground burnt over each season.

The tractor has thus been very effectively harnessed to the work of boxthorn hedge cutting and clearing of the debris on this farm and many others in Taranaki. The more general use of such machines in this district will undoubtedly reduce the cost of this work and permit hedge cutting to be done in season.

Direct Heading of



By D. R. WILKIE, *Instructor in Agriculture, Blenheim.*

WHEREVER subterranean clover is grown the problem of how to harvest the seed arises. The fact that the seed is formed on or under the ground, with the foliage on top, places the harvesting of this crop in a class by itself, and diverse methods are employed to secure payable yields. Previous methods include mowing and raking, sheepskin on the roller, a special lifting attachment on the mower, and recently the hayrake was found reasonably satisfactory. Now comes a method which has made quite an auspicious start—direct heading. Recent operations in Marlborough using the header harvester have been very promising.

As the seed lies on the ground covered by the foliage, at first glance the employment of the header seems to be practically impossible. But by using lifters which raise both foliage and seed to a sufficient height before the knife passes its use becomes more feasible. At Fairhall, Marlborough, at least two headers have been fitted up to handle subterranean clover seed. One seen working on Mr. W. Corlett's property last season was making a very satisfactory attempt—collecting, cutting, and threshing at the one operation two bags of field-dressed seed an acre. After the header had passed very little seed was left on the ground—less than usual after the older harvesting methods.

The header used was a small 40-inch-cut machine, and to it were attached special pea-lifters known locally as Cuddon lifters. For subterranean clover these attachments were fixed to each finger, three inches apart. The lifters were set right on the ground and the fans were taken low to deal with the flow of crop. This arrangement dealt very satisfactorily with the clover, which was three to four inches high and very dry, although at the time of

1. A close-up of the crop before harvesting.
2. Direct heading in progress.
3. The special lifters, three inches apart, which gather the crop before cutting. The ordinary outside divider makes an excellent swath-cutter in subterranean clover.

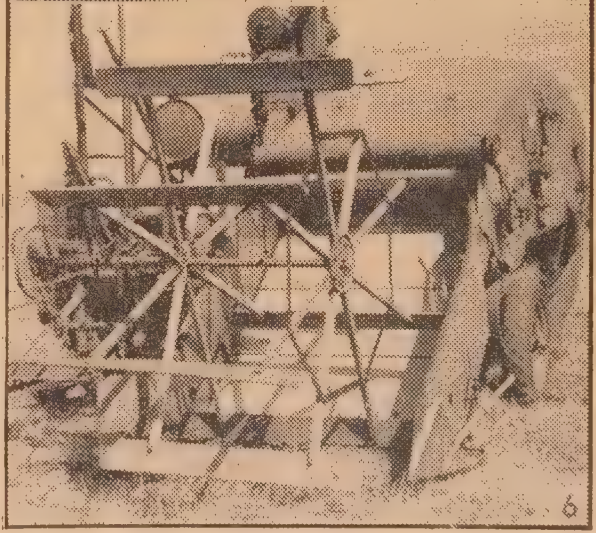
Subterranean Clover

harvesting there was still a little sap in the runners. Although there was a fair proportion of grass in the paddock, that did not materially affect the harvesting operation, as it would have had a hayrake, for instance, been used.

Subterranean clover is difficult to thresh, and it has been found advisable to put most crops through the thresher twice to get all the seed out. Nor can the seed be hit too hard, as it is then liable to crack. These difficulties must be overcome if direct heading is to be a success. With this method it is not practicable to put any of the crop through the machine twice, so some modification of the header is necessary. An extra concave made up of clover-huller rasps was used to rub out the seed. At first the rasps proved a little too severe, and between 10 and 15 per cent. of the seed was badly cracked. Though the sample was clean, it was losing both quality and value. It was thought that the trouble lay in the new rasps, and that when they were worn slightly the result would be more satisfactory. That proved correct. After the machine had had about a season's wear it threshed subterranean clover cleanly and without excessive damage to the seed.

The crop harvested in that instance was of the Tallarook variety, which does not force its seed into the ground quite as firmly as the more common Mt. Barker strain. It was thought that though the method was satisfactory with Tallarook, it might not be feasible with the deeper-seeding strain. However, a neighbouring farmer, Mr. W. Paynter, refuted that theory, as he gathered a satisfactory harvest of Mt. Barker seed by direct heading.

However, it is apparent that a good growth of clover is necessary before the header can be used. There must be sufficient foliage and runners to allow the lifters to get a grip on the crop. Direct heading would be impracticable in a very short crop, but where there is enough top growth it offers a relatively simple and effective means of harvesting a seed crop which hitherto has been very difficult to handle.

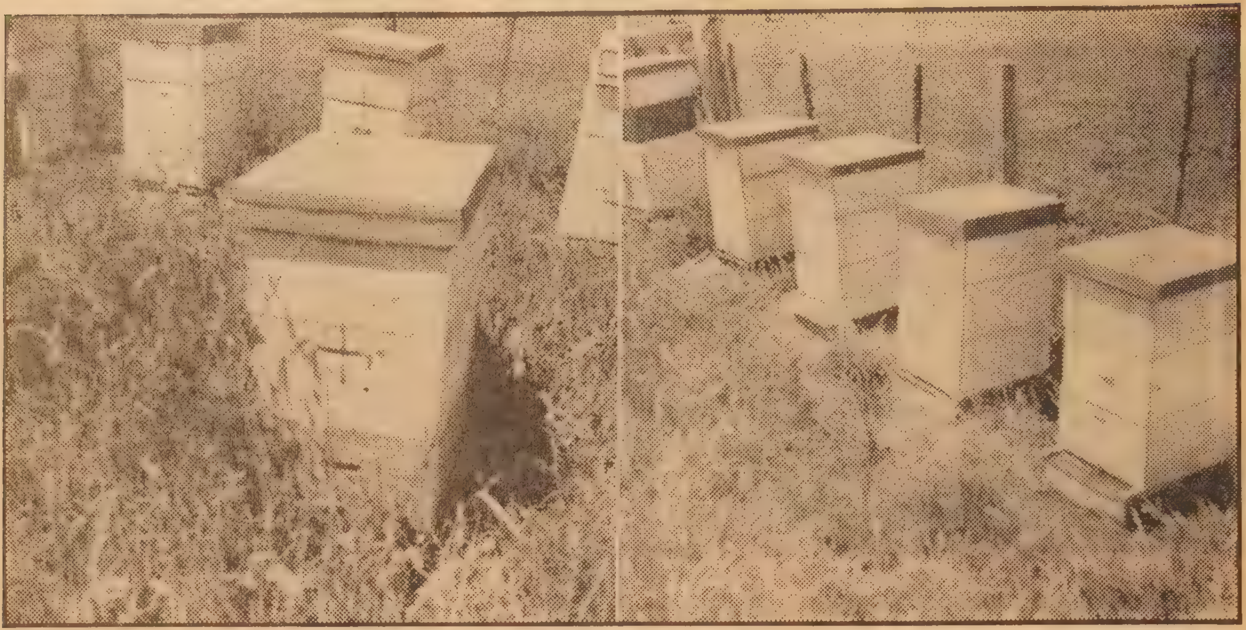


4. An advantage of direct heading is that very little seed is left.

5. Another view of the direct heading process. The grass in the paddock proved no deterrent.

6. The machine ready for cutting.

Control of Grass Around Beehives



Left—Growth of untreated grass round a hive. Right—Hives kept clear of grass by application of fuel oil.

CONSIDERABLE difficulty is experienced each year in keeping down excessive growth of grass and weeds around beehives. Long grass in front of the hives retards the activities of the bees, and causes some pollen to be lost when the bees scramble through the obstruction to reach the entrance of their hive. At critical periods in the spring the loss of this pollen may seriously affect progress of the bees in building up colony strength. Rank growth around hives prevents circulation of air under the floorboards, and not only keeps conditions damp in the hives but also hastens the deterioration of hive equipment.

ON permanent sites concrete slabs or paths make an excellent base on which to stand hives. Grass growth near the hives is thus eliminated, and hive material gives maximum service. In apiaries where tenure of the land is uncertain the expense of concrete foundations is not advisable. On fenced sites the general practice is to scythe the grass when it reaches sufficient length, grass clippers being used to remove the growth near the hives. Some beekeepers prefer to take a sharp spade and turn over a couple of sods in front of each hive. These methods take a lot of time, and relieve the position for only a short period. The use of weedkillers has never been popular, mainly because of the price and the fact that the ingredients are poisonous.

New Method of Control

In an endeavour to find some method safe to use and not poisonous, experiments with various materials were carried out last season. The most encouraging was one which gave very definite results over a period of three months.

At the beginning of October, when the growth of grass around the hives in a small apiary was about 6in. high, a fuel oil was used. This is a dark, thin liquid which can be procured from oil companies. Small quantities may sometimes be obtained from machinery merchants. A small watering-can with a fine rose was used to distribute the oil evenly over the grass to a width of about 9in. around each hive; two pints were used for each stand. Although this fuel has a very strong odour, it did not appear to affect the bees in any way unless they happened to alight on the treated grass soon after the application. To prevent this a flat piece of board was placed on the ground in front of each hive for a few hours, by which time the oil had begun to show its effect on the treated grass.

Growth in the Waikato during the spring of 1945 was never very strong because of the low rainfall in November and December, and that may have had some bearing on the results. Nevertheless, photographs taken at Christmas time show growth around the hives definitely checked, allowing the bees a good clear entrance, as illustrated at right above. The hive on the left shows what the growth would have been like around the hives had no measures been taken to check the grass.

This fuel oil costs approximately 1s. 2d. a gallon in bulk. The cost of one application was 4d. a hive, and growth around the hives was checked for 3 months during the most active growing period. Another small application in the autumn left the ground clean for the winter so that the floorboards would dry out quickly after wet weather.

The oil used must not be confused with used motor oil.

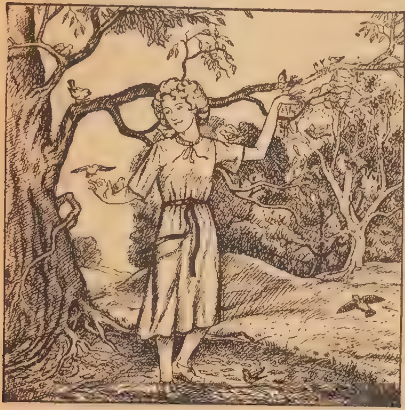
It would appear from experiments carried out for one season that fuel oil will give a very beneficial retarding effect to all growth around beehives at a cost that more than favourably compares with other methods of control.

C. R. PATERSON,
Apiary Instructor, Hamilton.

COMMERCIAL TOBACCO CULTURE

Those contemplating the growing of tobacco should secure Bulletin No. 137, "Commercial Tobacco Culture," by N. J. Adamson, obtainable free from your nearest office of the Department of Agriculture.

"The Little Brother of all Mankind"



FRANCIS of Assisi, the gentle saint who loved the fields and flowers, the birds and beasts, was the first to institute the Yuletide custom of presenting the scene of the Nativity which took place over 1200 years before in that hillside cave in Bethlehem. With the utmost reverence he depicted Mary and Joseph gazing down at the Holy Babe as He lay upon the sweet-smelling hay in His manger-bed, while in their corner of the stable the cattle watched, hushed and wondering. The records have it that St. Francis, in his initial portrayal of the advent of the Child whom God sent to save the world, was so realistic that he even used a live ox and ass. In fact, he made particular mention of these humble helpers in his petition: "If I were to speak to the Emperor, I would, supplicating and persuading him, tell him for the love of God and me to make a special law . . . that all the Mayors of the towns, and the Lords of the castles and villages, should be bound every year on Christmas Day to compel men to throw wheat and other grains outside the cities and castles, that our Sister Larks may have something to eat, and also the other birds. . . . And that . . . whoever shall have an Ox or an Ass shall be bound to provide for them on that night the best of good fodder. Likewise on that day, all poor men should be satisfied by the rich with good food."

THE NATIVITY

There was silence near the town,
And darkness crept so quietly,
And lilies bloomed so mistily,
And God looked down. . . .
Lamps in the tavern winked and smiled.
The cattle stirred on patient feet.
And God bent down . . . and pain was sweet . . .
And Mary bore her Child.

—Betty Maitland.

The belief that the oxen pay homage to the Child of Bethlehem on the anniversary of His birth inspired the late Thomas Hardy (whose poetry may outlive the prose which brought him fame) to write this lovely lyric:—

Christmas Eve and twelve of the clock.
"Now they are all on their knees,"
An elder said as we sat in a flock
By the embers in hearthside ease.

We pictured the meek mild creatures where
They dwelt in their strawy pen,
Nor did it occur to one of us there
To doubt they were kneeling then.

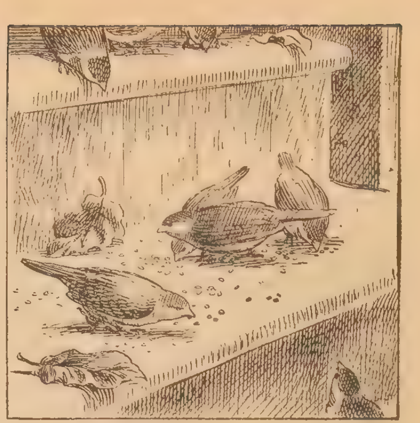
So fair a fancy few would weave
In these years! Yet I feel
If someone said on Christmas Eve,
"Come; see the oxen kneel,

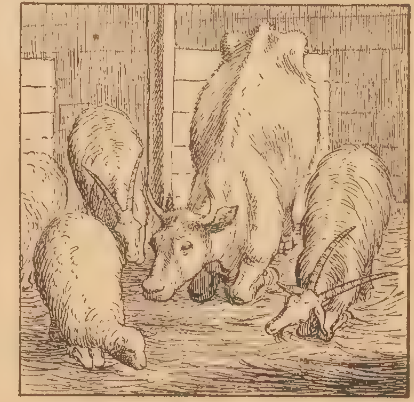
In the lonely barton by yonder coomb
Our childhood used to know,"
I should go with him in the gloom,
Hoping it might be so.

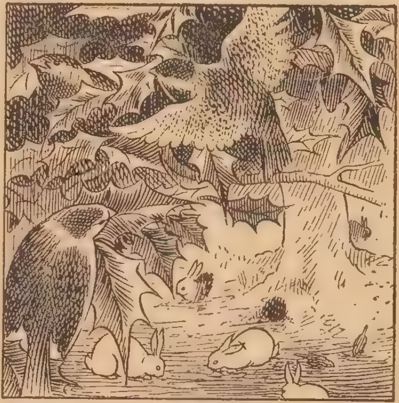
One of the most appealing of the Christmas legends and aptly according with St. Francis's conception of Christ as the "little Brother of all mankind" concerns the evergreen we call holly. Every tree in the Holy Land was anxious to have the honour of being the first to see the new King, thereby winning the guerdon of supreme beauty, and so they watched and waited for His coming. They were too preoccupied with their dreams of glory to notice the young Lad who sometimes walked beneath their shade and made friends with the birds and the forest creatures. Only the holly, so small and insignificant in comparison with its neighbours, offered the Boy shelter for His pets, curving its boughs for the birds to nest in, inviting the rabbits and other shy, wild things to burrow close to its base, holding its leaves with the spikes pointing upwards in order not to hurt anyone. Thus the tree of prickles gave sanctuary to all who sought protection, and continued to do so during the succeeding years until at long last there came a day when a Cross stood on Calvary's hill; and straightway the sombre branches of the holly bore clusters of the most beautiful berries, richly crimson like drops of blood.

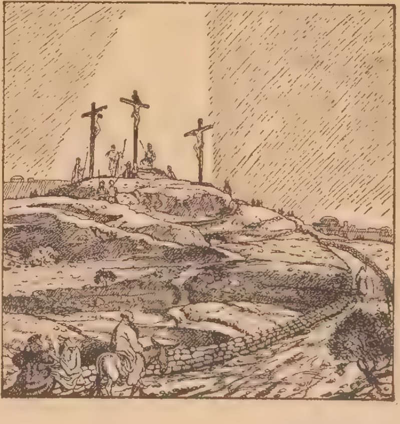
" . . . And now the holly tree,
The Christ-thorn, is the symbol of our immortality."

Mary









First Aid in the Home

ARTIFICIAL RESPIRATION

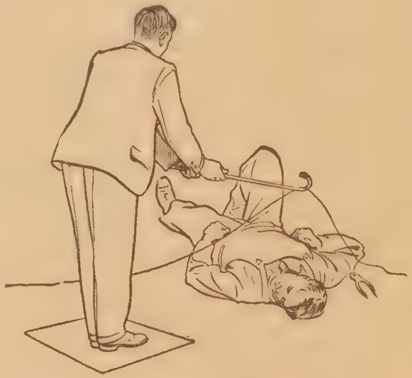
BECAUSE a life may depend on the prompt and correct use of artificial respiration, it is important that a "first-aider" should know how it is administered. In this article, the fourth of a series, C. Meachen, secretary to the St. John Ambulance Association, Wellington, describes the steps that should be taken to treat asphyxiation by artificial respiration.

OF all the forms of asphyxiation, electric shock is perhaps the most serious from the first aid point of view, because it causes paralysis of the whole nervous system. Unless artificial respiration is commenced within four or five minutes, the chances of recovery are remote. Do not wait; start artificial respiration immediately and keep it going. If the lungs are prevented from obtaining their supply of air, death will result from suffocation or asphyxiation. But do not think that, because the patient cannot be seen to be breathing, death has occurred. Continued artificial respiration has saved many lives, sometimes when the treatment has been prolonged and the case has seemed hopeless.

Some of the more common home accidents requiring artificial respiration treatment are:

Electric shock, drowning (which may be considered impossible, but has happened, in baths), choking (especially among infants whose food is being changed from liquids to rusks), and suffocation, which can be caused by smoke from a washhouse, an open fire, fumes from burning coke, or escaping gas.

Leaving the engine of a motor-car running in a closed garage can cause a person to be asphyxiated. The gas from the exhaust fumes of the car is known as carbon monoxide and is deadly poisonous. The chief danger of carbon monoxide is that it is vapourless and odourless.



Method of insulating oneself when removing a live wire from a victim of electric shock.

ELECTRIC SHOCK AND DROWNING

In a case of electric shock or drowning—both of which cause suffocation—remove the patient to fresh air immediately, but remember in a case of electric shock that you should **never touch the patient until you have insulated yourself.** Protect your body from any contact with the patient's body by wearing rubber gloves, or by standing on rubber or thoroughly dry wood. If it is a wet day or night, stand on a piece of glass. Either switch off the current, or remove the live wire with a wooden walking stick or the house broom, but never use an umbrella, because of its metal ribs and fittings. Place the patient flat on his stomach, the head turned to one side and the arms stretched out from the shoulders and bent upward from the elbows, with the palms down. This position gives the greatest possible expansion for the lungs. The head is turned sideways to keep the nose and mouth clear of the ground. Do not be concerned about pulling the tongue forward, as it will naturally fall forward toward the front of the mouth. Kneel at one side of the patient, facing the head with your knees together just below his buttocks; sit on your heels. Next, place your hands in the small of the patient's back, your wrists close together so that the thumbs are almost touching, and the fingers together and pointing outward toward the ground at each side of the loins.

Keep your arms quite stiff throughout the whole operation. Bend the body from the knees, partially straightening yourself from the hips until the shoulders are right above the hands—do not lean forward—keeping pressure on your hands all the time. This presses the patient's stomach to the ground and forces the air—and there is always a little air in the lungs—out through the air passages and mouth. No extra pressure is required and the weight of your shoulders, passed through your straight arms, is sufficient. Swing the body slowly backward until the original position (sitting on your heels) is resumed, keeping your arms stiff all the time. This movement takes your weight off the patient's abdomen and thus allows air to be drawn into the lungs.

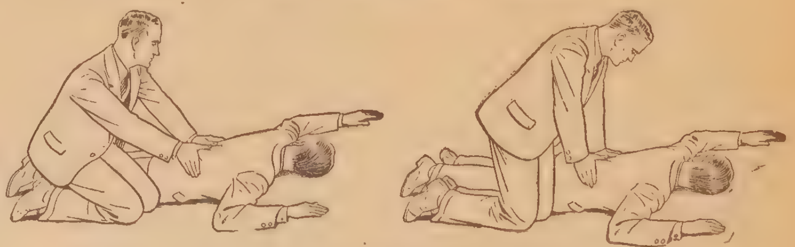
Continue the forward and backward movement of the body, **always keeping the arms straight,** so that pressure is on the hands for two seconds and the time taken to swing the body backward and forward is three seconds. An easy way of gauging each second approximately is to count "one hundred and one, one hundred and two, one hundred and three," and so on.

Continue the movement until a doctor arrives, unless, of course, the patient shows signs of recovery and breathing has begun. Should breathing begin, the rate of pressure and relaxation can be regulated to suit the patient's breathing. Help the circulation of the body by getting someone else to rub the limbs gently in the direction of the heart, and by keeping the patient warm. If possible, apply well-covered hot water bottles.

Take great care to watch the breathing for some time in case it should weaken or appear to cease. If this happens, resume artificial respiration.

CHOKING

In all cases of choking immediately remove the obstruction in the throat by slapping the patient sharply on the back between the shoulder blades. If this fails, try to remove the cause of choking by passing the index finger down the back of the throat and it may be possible to draw the obstruction forward. If this fails, try to push it down the gullet past the entrance to the windpipe. Loosen all tight clothing from the neck to the waist. If breathing has stopped, apply artificial respiration as soon as the throat is clear of the obstruction, and promote warmth and circulation in the manner described.



Correct positions for the application of artificial respiration.

MARMALADE

By EVA TOPPING, *Rural Sociologist, Auckland.*

MARMALADE making is not much different from jam making, except that the thick rinds of the citrus fruits take a longer time to cook than the softer fruits from which jam is made. The pectin which causes the cooked fruit to jelly is contained in the pith, and a recipe which said in the directions "with a sharp spoon tear out the white pith which is useless and indigestible" was fundamentally wrong, for the white pith is the most important part of the orange in making a marmalade of good jelly-like consistency.

THE acid which helps to bring the pectin into solution is present in the pulp and juice in sufficient quantities in the early part of the season, but should the marmalade making be delayed until the oranges are very ripe and so contain less acid, an extra quantity of lemon juice can be put with the peel and pulp when the water is added.

General Directions

Cutting up the fruit: The consistency of the marmalade can be varied by the method of cutting the rinds; for those who like plenty of chunky pieces the peel can be coarsely sliced; for those who like fine shreds in jelly the rinds can be scraped with a marmalade shredder, and for very busy people who need quick methods the fruit can be put through a mincer. For the marmalade to jelly well the pectin in the pith must be brought into solution, and naturally the thinner the peel is cut the more readily this will occur. However, when fine shreds are required the pith can be more coarsely cut than the rind, tied in a muslin bag, soaked and cooked with the pulp, and removed before the sugar is added. The pips also should be soaked in some of the water, as they help to form jelly.

Soaking the fruit: A comparatively large amount of water is added to the fruit to allow for the evaporation which takes place when cooking to soften the skins. Soaking for 24, 36, or even 48 hours helps to soften the peel and pith, but equally good results can be obtained by making the first boiling period longer. Often pulp is left to stand for a further 24 hours after the first cooking and before the sugar is added, but this is not necessary and is wasteful of time and fuel, though occasionally it may be a convenient plan when it is not possible to finish the whole process at one time.

Boiling the pulp: After soaking, the fruit, pulp, and water should be turned into a preserving pan and boiled steadily. Most of the cooking should be carried out before the sugar is added; the skins will then be transparent and soft and the total amount in the preserving pan will be greatly reduced. This first cooking will take from two to three hours, according to the quantities being used. When the reduction of the pulp is well advanced before the sugar is added, the second cooking will take very much less time and a marmalade of good colour and flavour is obtained.

Boiling the pulp with sugar: To save fuel and time the sugar should be warmed thoroughly in the oven, when it will not reduce the temperature of the pulp so much and will dissolve more readily. Put it in the oven in a clean baking tin or mixing bowl, stir occasionally, and watch carefully to prevent it scorching. Add the required quantity to the pulp, stirring continually until the sugar is dissolved. Bring to a rapid boil, stirring occasionally, and remove scum which almost at setting point. Delay in removing the scum causes it to cling to the peel and skimming will be difficult.

Testing for setting point: When the marmalade begins to look clear and thick, and heavy scum is forming round the edge of the pan, test for setting by the cold plate or flake test. For **cold plate** test, take a little of the preserve and pour on to a cold plate in a thin film; set in cold place or draught to cool. If the surface sets and wrinkles when pushed with the finger, setting point has been reached. One drawback to this method is that the bulk of the marmalade is allowed to go on cooking while the small quantity is cooling and may become over-boiled, so draw the pan from the heat while testing. For the **flake test** dip a clean wooden spoon into the marmalade, remove and turn horizontally in the hand to cool the adhering preserve, then allow to drop from the spoon. If it is sufficiently boiled, the drops run together and form flakes which break off clean and sharp. When setting point is reached take the pan off the heat and stand aside to cool until a skin is just beginning to form, then stir well before filling the pots, and the peel will be held in suspension instead of rising to the top.

Filling into jars and sealing: All jars should be well washed, dried thoroughly, and warmed before filling. Put them into a cool oven with the door open or set on the rack above a range. Fill almost to the top; but do not overflow. Cover with a film of melted paraffin wax or circles of waxed paper. Cover with screw caps, cellophane, or pasted paper covers to exclude air. Label and store in a cool dry cupboard.

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General Recipe (I)

6 large marmalade oranges;
Juice of 2 lemons;
3 small sweet oranges;
3 pints water to every pound of fruit.

Weigh the oranges and record the amount. Wipe the skins, cut into quarters, and slice the desired thickness. Put into an earthenware bowl, pour on the lemon juice, and add three pints of water to each pound of fruit. Tie any pips in a muslin bag and put into bowl with fruit. Leave to soak for 24 hours. Pour into preserving pan and cook until the skins are quite soft and the total amount of pulp and liquid is reduced to about half the original quantity. Measure the contents of the pan and add an equal measure of sugar. Stir over heat until the sugar is dissolved and marmalade is boiling rapidly. Test for setting, remove scum, and stand aside to cool slightly. Stir thoroughly but gently and pour into clean warm jars.

This recipe can be varied to suit the citrus fruits on hand; the sweet oranges may be omitted or increased, lemons **and** oranges used instead of all oranges or grapefruit, and so on. The procedure is exactly the same:—

Weigh the fruit;

Allow 3 pints water to each pound of fruit;

Soak;

Boil to soften rinds and reduce;
Measure pulp;
Add equal amount of sugar by measuring.

General Recipe (II)

2½ to 3lb. oranges;
Lemons (at **least** 2);
10 pints of water.

Cut up and soak overnight as in foregoing directions. Boil for 1 hour, measure, and add 1 cup of sugar for each cup of fruit; cook until setting stage, cool, put into jars, and seal. The fruit can be varied as required.

Lemon Shred Marmalade

6 large lemons;
6 pints water;
Sugar.

Wash lemons; pare off the yellow rind as thinly as possible, and cut into fine shreds. Put shreds into an earthenware basin and cover with water. Peel off the pith and cut into small pieces. Remove the pips and tie with the cut pith in a muslin bag; put into the basin with rind and water. Slice the lemons thin and add; leave to stand overnight. Boil until pulp is reduced and thickened. Weigh the contents of the pan and add an equal weight of sugar. Bring to boil and continue boiling rapidly until setting stage is reached. If the first boiling has been thorough and the pulp well reduced, the setting point may be reached after 10 to 20 minutes' rapid boiling. Cool slightly and pour into pots, cover with waxed paper circles or melted paraffin wax, and tie down either hot or cold. Weigh the empty pan before beginning to make the marmalade and remember to subtract its weight from the weight of pulp and pan when calculating the amount of sugar to be added.

Marmalade (Partly Made in Oven)

Select 6 good poorman oranges or N.Z. grapefruit and 1 lemon.

Wash thoroughly and cut in quarters through length. Cut out the cores and pips with a sharp knife and tie in a muslin bag. Put the quartered fruit and the pips into casserole, cover with 3 pints of boiling water, and replace the lid. Bake in a slow oven for 4 to 5 hours until the fruit is quite tender. Cool and cut the peel coarsely. Weigh the fruit and juice and use the same weight of sugar. Put fruit and sugar into the preserving pan and boil briskly until the juice jellies when tested on a cold plate. This way the marmalade can be made in one day.

Orange Jelly Marmalade

6 lemons;
6 oranges;
Sugar.

Squeeze the lemons and measure juice and add three times as much water. Scrape the rind from the oranges with a marmalade shredder and tie the chips loosely in a muslin bag. Cut the white pith and flesh of the oranges and three lemons into very thin slices. Pour over the diluted lemon juice, put in the bag of chips, and soak for 24 hours in an earthenware bowl. Boil until the pulp is soft then strain through two thicknesses of butter muslin, squeezing gently to extract all the liquor.

Measure and for every 2 cups of juice add 1¾ cups of sugar. Put into preserving pan and add the chips shaken free from the muslin bag. Boil rapidly to the jelly stage; cool slightly, stir and pour into jelly jars.

This recipe gives a clear jelly with fine shreds of peel through it.

Photograph by Sparrow Industrial Pictures Ltd.

A CHRISTMAS WISH

Sing a song for Christmas—
With all their bells in tune
Tuis in the sunshine
Are singing at high noon—
Rippling peals of music
Echo through the trees,
Silver magic dancing
On the summer breeze.
Christmas bells are chiming
To wish you all good cheer—
May you have your heart's desire
In the coming year.

—*Sheila D. Stavely.*

"Treasured Possessions"

THE items listed under the heading of "Treasured Possessions" ranged from valuable heirlooms of silver and china, jewellery and hand-worked lace, to letters and albums and similar mementoes which, though not of any great monetary worth, are nevertheless dearly prized by their owners. The interesting description by "London Lass," Wellington, of her "treasures" was awarded first place, and second place went to "Willow Whistle," Papanui.

First Prize

TREASURED possessions—it would be rare indeed if the thought of them did not bring light to the eye and added warmth to the heart. And if, in addition, it is true that "appreciation is possession," then one would need no happier task than to increase the joy of possession by sharing one's treasures. Leaving aside, then, the various ways of housing china and glass that enhance their beauty, come and enjoy with me those things dear to my heart.

Wedgwood willow pattern one hails as a familiar friend, not only for its fresh blue-and-white, but for the story that clings to the design. Whether it is authentic or not is uncertain, but it is romantic enough to claim its share of affection. There is another piece of Wedgwood close by—a plate from a dessert service, in the shape of a vine leaf and in its natural green shade. This belongs to the earlier part of Wedgwood's career, when he first began to follow his father, his grandfather, and great-grandfather, all makers of fine and beautiful china.

Two small pieces of Dutch pottery are worth our notice, one a small bowl and the other the shape of a wooden shoe. Soft, subdued yellow, blue, and green, under a dull glaze, they are a harmonious pair. Mention of pottery sets up a train of recollection: "Pottery—potter—Pallissy the Potter!' A surprisingly long way back it goes, to the early 16th century. He was a Frenchman, born in 1510, and apprenticed to a glass-painter. He later became a travelling workman, with a deep-seated love of natural history and geology. While at Saintes he was shown a cup, probably of Chinese porcelain, then one of the wonders of Europe. He determined, to use his own expressive phrase, "like a man who gropes in the dark," to discover the secret of its manufacture. He had no equipment but a knowledge of peasant pottery, and toiled on for 16 years, through a succession of heart-breaking failures. It brought his family to poverty, for he was often reduced to burning his furniture—even the floor boards—to fire his furnace. Longfellow, in his poem "Keramos," pictures him

> "By mingled earths and ores combined,
> With potency of fire, to find
> Some new enamel, hard and bright,
> His dream, his passion, his delight."

In the last desperate moment Pallissy succeeded—and his place in history is bound up with his efforts quite as much as with the type of pottery he produced. These, chiefly bowls and plates, bore figures in relief of flowers, plants, and small creatures of river and field, modelled with a loving fidelity.

But let us return to our exploring of the china-rail.

Set in a place of honour are several pieces of Wedgwood "jasper" ware. Here, perhaps, is Josiah Wedgwood at his best. He discovered and used a white terra-cotta of great beauty and delicacy for carved cameos and portraits. Some 12 years later he improved on it by giving the fine porcelain a jasper "dip" or coating. The carving of the well-known white frieze on the blue ground was the work of Flaxman, a talented sculptor and modeller. To take a piece of it in one's hands—to ponder the Grecian draperies that seem to flutter in the wind, the chubby Cupids and equally winsome children, the peacock with his dignified mistress, the scene of a hunting sacrifice, even the wreaths of grapes and vine leaves, carved with such skill—is to handle it in wonder. Irresistibly, it recalls Keats's matchless "Ode on a Grecian Urn."

CORSO CHRISTMAS

The Christ-child came at Christmas-tide
And knocked upon my door.
So weary, there He stood alone,
His little feet were raw.

"Why plead ye here, ye ragged child?
Begone; let begging cease!"
The Christ-child scuffed His toes and said,
"I am in need of peace.

"Your bells disturb my mounting prayers;
I cannot hear your songs of praise.
The sighs of the homeless drown your chants;
Despair of the hungry fills my days."

I almost closed the door; but ran
And filled His hands with bread. And then
Smiling He took His bag and went . . .
I heard the first goodwill to men.

—Phyllis Warner.

Forsaking the china-rail for a moment, peer into the oak cabinet. Does "period" or "place" prick your interest the more? A case for holding visiting cards, of mother-of-pearl inlaid diamond-wise, lies beside the fine glass holder for the cards themselves. It is in the form of a sailing ship, supported by a crystal dolphin. What spacious days and leisured courtesies they recall! And if those represent the gentler sex of those days, their counterpart is not absent. For, when a winter's night called for a "nightcap" of toddy before retiring, an array of articles was required. The cone of loaf sugar, pincers to cut off a piece, the crusher to crumble it, a slice of lemon, the whisky, and boiling water—all were assembled. And here you may hold in your hand one of the things just mentioned. For when the lump sugar was ready in the glass, it was crushed by this pestle. We of the 20th century salute you of the 19th!

Would you rather handle something that came from far away? This glass mug, some 2½in. high, was brought from Russia, where vodka, the national drink, was served in it. The tiny lustre teaset, complete in a 2in. by 3in. tray, came from the south of France. This glittering piece of quartz is a bit of the Rock of Gibraltar, and beside it an insignificant pebble—but it was picked up in the ruins of Pompeii.

Again, the Staffordshire saltglaze jugs, ranging from ½ to ¾in. high to varied pieces of ordinary-sized Staffordshire, speak unmistakably of England at her best. They have hunting scenes in relief, and portly squires with foaming tankards and churchwarden pipes, in cream on a fawn and brown ground.

In friendly association with them are the Toby jugs, two plump-bodied little men, one curve of their three-cornered hats making the lip of each jug. Once again we are irresistibly drawn to realms of entertaining discovery. For Toby jugs began by being earthenware jugs for ale, to replace the leathern "black jacks" as a safeguard against short measure. In passing, it recalls Simon the Cellarer, whose wooing of Dame Margery was not altogether successful, because she did not approve "how oft the black jack to his lips did go." These jugs, or beer pots, grew first out of an ancient grudge held by Protestant Dutch potters against a Cardinal of the Church who had been unduly severe on them. When he died they cut his likeness roughly on the jugs and called them after him. Some 70 years later these jugs had acquired a new name, with a happier association. Toby Fillpot, apparently, was a drinker whose ways were the talk of the countryside, and his feats in this direction prompted the Rev. F. Hawkes, in 1759, to put them into a song, half-humorous, half-gruesome. These are its first and last verses:

> "Dear Tom, the brown jug that
> now foams with mild ale,
> (In which I will drink to sweet
> Nan of the vale)
> Was once Toby Fillpot, a thirsty
> old soul
> As e'er drank a bottle or fathomed
> a bowl.
>
> "His body, when long in the
> ground it had lain,
> And time into clay had dissolved
> it again,
> A potter found out, in the covert
> so snug,
> And with part of fat Toby he
> formed this brown jug."

Prowess in drinking, with attendant good-fellowship, thus became the accepted idea connected with the Toby jugs. And here, as though to draw us right into the midst of jolly company at some cheerful inn, is the finest Toby jug of them all! In green-glazed pottery, more than pint size, with a grin that seems first cheerful, then sardonic, according to the angle at which it is held, is a character stepped straight from the past. In the Devonshire song "Widdecombe Fair" mention is made of the cronies who rode to the fair astride the grey mare: "Bill Brewer, Jan Stewer, Peter Gurney, Peter Davy, Dan'l Whiddon, Harry Hawke, Old Uncle Tom Cobley and all." Well, our green Toby jug is Jan Stewer himself—witness his name carved on his collar—the very embodiment of the old song.

I heard it said recently that persons' characters may be summed up by their treasured possessions. These, then, are mine, apart from the intangible gems of friendship, music, books, and nature. I leave the judgment with those who share my treasures.—**"London Lass."**

Second Prize

AN oval lustre dish, which has successfully negotiated the many packings and unpackings of a much-travelled existence, is a piece of china I should be sorry to lose. More years ago than I care to admit I was on a visit to Auckland, when a friend took me to a garden party held by Miss Elsie K. Morton for the girls of her "page." It was a delightful experience and I can still visualise the glorious garden in which it was held—a garden which Miss Morton has endeared to her readers in that chucklesome book "Gardening is Such Fun" and to her radio audience. Only a woman could have grown such a garden. It was a glorious hodge-podge of cornflowers, scarlet poppies, and escholtzias, ablaze with colour. Little paths crept among the blooms, and here and there the gardener had made a determined effort to conform to the accepted standards of respectable suburban gardening by carving out little formal beds for sweet peas, carnations, and other treasures. As one wandered through this field of wild flowers, these formal beds came as a distinct surprise, and no less surprising to my country eyes was a large bush of St. John's wort, which I had been accustomed to regard as little better than ragwort. In fact, I would not have been astonished to come face to face with a ragwort bush at any moment.

After the challenging glare of colour it was inexpressibly restful to sit under the shade of the fruit trees. Here was cool, green lawn which took on a new tranquillity, and a white-painted seat on the back of which some verses had been written by Isobel Maude Peacock, Miss Morton's friend, as a memorial to Miss Morton's mother, for it was here that she loved to sit in the summer afternoons. A lovely idea, don't you think? One that has always appealed to me.

And the dish. Well, that was fifth prize in one of the competitions, for Miss Morton, like the kind and gracious lady she is, had arranged the number of prizes to suit the number of guests. I always wash and dry it most carefully and pack it with special care when it goes on its travels, for it never fails to bring back to my "inward eye" a picture of that lovely garden with its dazzling colour and the cool, hallowed contrast of the trees.

—**"Willow Whistle," Christchurch.**

TO GWENETH, WHO WRITES TO ME

I have a friend who gathers treasure,
Sweet treasure of the cadenced word.
(How else should she linger on "grey-
winged day"
On chords that her inner heart has
heard?)

I have a friend who garners beauty—
To her, dawn's tender star is fair:
A gull's slow grace, an autumn leaf,
And birdsong, borne on tranquil air.

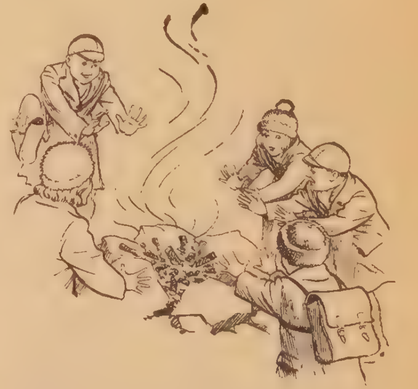
Yet though she garners joy, and treasures
it,
She hoards it not, as misers do their gold.
Gifts fill her eager hands, and into mine
She pours them freely for my heart to
hold.

—M.E.T.

Full Many a Mile to School

I HAVE lived among hills most of my life and they still draw me back. Our hills are almost bare of foliage except for the occasional lines of pines upon their ochred crests. Nevertheless, the valley also has its appeal, with its cultivated river flats and curving landscape bordered on either side by tussocked hills, while the snow-capped Alps meet the gorge and cut deep into the valley on the farther side.

I remember as a child watching the sun rise on a winter's morning. Being the eldest I used to marshal the family together at 7.30 a.m. and we would start out in a sleeping world of white frost to walk a full mile, mostly uphill, to the station gate to meet the school bus at 8 a.m. Half-way up we had a resting place and would stop to watch the sun rise. There would be a brightening of the sky in the east behind a hill across the valley, and then the orange rim of the sun would make its appearance over the crest. Gradually it grew larger and if you stood very still you could see it slowly moving until it looked like a golden ball resting on the hill and you could feel its warmth. It set the frost crystals shooting myriads of colours in every direction, colours clearer and purer than earth-born gems as they festooned the grasses, tussocks, and gorse bushes. I just couldn't concentrate on French verbs with such beauty before me, so I'd give it up and continue to gaze about me as I reluctantly continued on my way. If we were early, or the bus late, and we were becoming chilly with waiting, we'd collect pieces of dead gorse and place it in our boulder-built fireplace where my eldest brother would strike a match to it. Then we would huddle close to the flames to be warmed and comforted ready for our long and tedious journey to school. When we returned the sun would be set, so we'd run to keep warm till we reached home where Mother would have a hot dinner awaiting us.



—**"Clara Jane," Rakaia.**

BACKGROUNDS: Wall and Floor Coverings

By NORMA K. METSON,
Rural Sociologist, Wellington.

WALLS and floor are the chief background areas in a room, and such large surfaces are naturally important in the decorative scheme. Floor coverings in particular are so expensive that they may have to last literally a lifetime, so careful choices, which will be adaptable to future as well as to present needs, are essential. That may sound ironical at present when there is so little choice available and most decisions must be of the "take it or leave it" type, but in such cases it is usually wisest to "leave it," even for a considerable period, rather than risk spending a large sum of money on something that is not really wanted. Floor and walls must be considered in relation to each other and to the whole plan of the furnished room.

[Sparrow Industrial Pictures Ltd.

IN a small room, walls and wood trimming—skirting boards, window sills, etc.—should all be the same colour, as that makes the room appear larger. Undesirable features which for some reason cannot be removed—for example an ornate picture rail—can also be painted out in that way. If there are particularly attractive furnishings or pictures which you wish to display, keep the walls as plain as possible so that they will not divert attention from the things it is desired to emphasise. Walls should be plain if the floor covering or much of the other furnishings is patterned. A nondescript room, on the other hand, may be brought to life by a good patterned wallpaper or walls of some clear definite colour instead of the usual creams, beiges, and light tints.

Choosing a Wallpaper

Patterned wallpapers are often poor in design—naturalistic birds, flowers, and fruits, for example, and regular repetitions which insist on being counted, or give the effect of diagonal lines. So if a patterned paper is decided on, finding one which is suitable may prove difficult. The pattern should be in scale with the room; big, bold patterns are not for small rooms, just as small, fussy designs are out of place in large ones; vertical stripes should never be used in narrow, high-ceilinged rooms, but are very useful to give an effect of height in a low room. Odd-shaped projections in a room, or walls which slope to the ceiling, need treatment which will make these features inconspicuous; a paper with a pattern is best, and the ceiling should be treated in the same way as the walls. The deep friezes of different-coloured paper which are found at the top of the walls in most old houses are not appropriate for modern low-ceilinged rooms.

Texture in wall coverings is important and should be in keeping with the rest of the room. A smooth-surfaced paper has quite a different effect from one with a rough "oatmeal" texture, just as a glossy paint differs from a flat lime wash in appearance of colour and power to reflect light.

Unconventional Treatments

Less conventional ways of treating walls are sometimes appropriate. To make one wall the centre of interest in a room, paint or paper it differently from the other three—for instance, have three plain walls and one patterned or of another colour; the contrast, of course, must not be violent. If that is done with one end wall, a long narrow room will appear shorter and the proportions improved.

A dado can be used to advantage in some rooms, particularly those with a high ceiling. The height of the dado must be chosen carefully to avoid a haphazard appearance; it should correspond with some other feature of the room—the level of the window sills or of the main pieces of furniture. Polished wood panelling makes a rich

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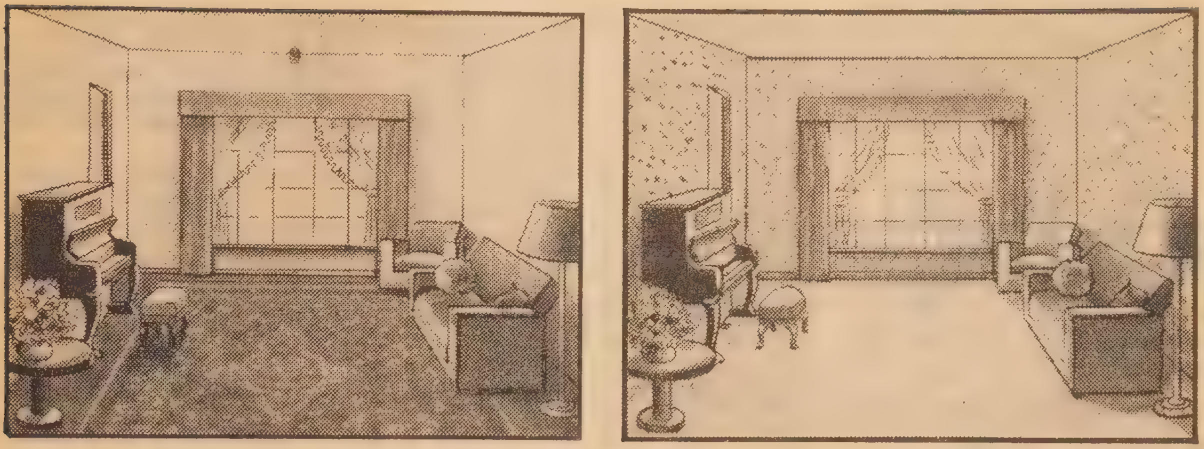


Floor and walls are the two largest background areas. If one is patterned, the other should be plain.

and satisfactory finish for the hall and formal rooms of a large home. Wallboard can also be used to give interesting panel effects, but the wall spaces should never be broken up too much, or into badly-proportioned areas.

Murals, which are decorations designed specially for walls and applied directly to them, are not usually found in private homes, though motifs stencilled or otherwise applied to painted walls are sometimes used in children's rooms. Beautiful textiles and tapestries are effective when hung as wall decorations, and are likely to become fashionable, as many such fabrics have been brought back from overseas.

Pictures look best hung at eye level. Important pictures should be hung alone where they attract the attention that is their due. Small similar pictures look well framed uniformly and hung in a group. If they are scattered about the room, the effect is spotty and disturbing.

Floor Finishes

Floors in most New Zealand houses are of wood, which may be finished by oiling and waxing, staining and varnishing, or painting with a special floor paint. Penetrating floor seals are a new type of product for finishing wood floors. Instead of forming a surface film like paint or varnish they penetrate and seal the pores of the wood. The finish thus obtained resists wear, does not show scratches, and is easy to keep clean.

Some newer houses have composition flooring of various kinds which, if not already suitably coloured, may be painted. The choice of an additional floor covering will depend on the nature of the room, the amount which can be spent, and the goods which are available.

Carpet Qualities

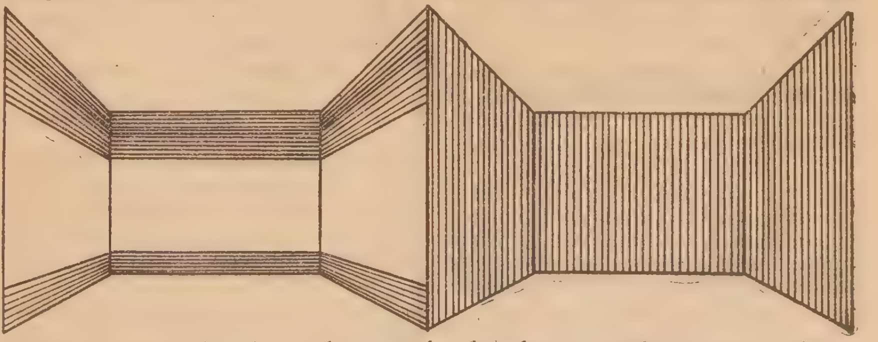
Choice in carpets is likely to be limited for some time, but if there is a choice, look for carpets which have a firm, closely-packed pile and a strong backing tightly woven and without sizing, which may be added to give an artificial stiffness. Other things being equal, the deeper the pile of a carpet the longer the wear to be expected from it. However, if the choice is between a loosely-woven, long-piled carpet and one with a dense but short pile, the one with the close, compact pile will give longer service.

All-over carpeting is sold as strips 27in. wide, which are cut and sewn to fit the room exactly. It has the advantage that it can be run through adjoining rooms, halls, and passages without a break, giving an appearance of unity and spaciousness. Individual rooms look larger if they are carpeted from wall to wall, and furniture is easier to arrange in them. The expense of buying and laying all-over carpets is considerable, so it is most important to look for good quality and a pattern and colours which will not quickly become tiresome.

Carpet Squares and Rugs

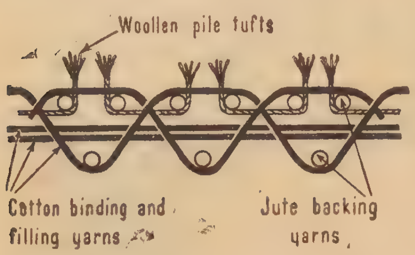
Design in carpet squares should also be considered carefully. A carpet smaller than the room tends to create a broken effect, and if the pattern has definite divisions and pronounced borders this effect is emphasised. If an all-over covering is desired, a border of felt flooring or linoleum may be used with a carpet square. If the carpet is rectangular, this border should be made wide enough on all sides so that gaps will not be left if the carpet is turned round. Turning lengthens the life of the carpet by distributing wear more evenly.

Small rugs are useful to protect the main floor covering where wear is severe—in front of the fireplace, for example—or to give added comfort in a room which is not carpeted. If small or medium-sized rugs are used, they should be placed with their sides parallel to the walls of the room, and not scattered at unrelated angles. One or two rugs of larger size are much



These two sets of walls are the same size, but they are made to appear quite different by the use of vertical and horizontal lines.

better than several small ones. Unless the pattern can be matched exactly, plain rugs are best on patterned carpet or linoleum. Hand-made rugs are worth considering for temporary or permanent use, as they can be very attractive in design and colour.



The construction of a pile carpet.

In choosing linoleum it is essential to distinguish between inlaid linoleum, which is constructed so that the pattern extends right through the thickness of the material, and printed linoleum, which has merely a surface pattern likely to wear off in time, especially in places which are much walked on. In addition to the normal 6ft. widths of linoleum, finished "rugs" of various sizes may be bought.

Benefits of Underlay

Floor coverings should have an underlay. Carpets are best laid over felt, which protects them during hard wear, and also adds greatly to the comfort of the room. Tests carried out by the U.S.A. National Bureau of Standards showed that 75 to 146 per cent. increase in wear was gained from using underlays with carpets. The deeper and springier the underlay the greater was the increase in length of life of the carpet.

Linoleum, too, if it is to be laid on a floor which is at all uneven, should have pads of felt or newspaper below to prevent ridging and cracking. In very cold weather linoleum should be left in a warm room for several hours before it is unrolled for laying on the floor or it may crack.

Any successful artistic composition—painting, photograph, or furnished room—must have an appropriate relationship between the background areas and the points of emphasis. If the walls and floor of a room are made too striking by the use of vivid colours and elaborate patterns, the furniture and accessories will not stand out and the general effect will be of confusion.

◆

I will honour Christmas in my heart, and try to keep it all the year.—Dickens.

Homes for Farm Families

A REPORT on farm housing issued by the United States Department of Agriculture stated that of the 6,500,000 dwellings only one-third were classified as "acceptable", one-third needed major alterations or repairs, and the others were in such a poor condition or so small as to be unfit for human habitation. Intensive surveys of farm housing were carried out. One study concerned the functions of the farm house, and opinions on housing needs were collected from farm housewives in 44 States. Another study was made of the storage and cupboard requirements of a farm house, and 2,294 replies from housewives were analysed by the Department. A third study was conducted to determine farm families' ideas of the minimum standards of comfort and convenience for a country home. This mass of information, collected entirely from farm families, has been used as the basis for bulletins and reports which are available to anyone who wishes to build, renovate, or improve a farm house.

Conditions in New Zealand certainly may not be so extreme; there is probably not so much variation in the conditions and quality of farm housing, and the standard of the majority of houses may be higher. But undoubtedly there are many houses which could be greatly improved, and certainly many new farm homesteads will be built in the near future. To meet the need for help with these undertakings the Department of Agriculture wants to introduce a new service which will provide plans for houses of various sizes suitable for farm family requirements, and suggestions for renovating and remodelling older existing houses.

The Rural Sociology Section has prepared a questionnaire which seeks information about the size, condition, and equipment of farm houses and the preferences of country people in floor plan, size, number, and type of rooms, porches or verandahs, means of heating, fixtures, storage requirements, etc. When the completed forms have been collected and analysed the Department intends to have plans prepared which will reflect New Zealand farm families' own preferences and requirements—in fact, they will be plans for country homes designed by country people to meet their special needs instead of plans devised by people who are not intimately familiar with the daily routine of farm home life.

Your opinions and **your** ideas are sought. Will you help to formulate these house plans and suggestions? Any information you give will be regarded as confidential.

Fill in the application form for a questionnaire below and post it to the Rural Sociologist for your district.

The Rural Sociologists will also answer inquiries from country women about nutrition, preparation and preserving of food, and home management generally. Make use of this service.

North Auckland and Auckland:
Rural Sociologist,
Department of Agriculture,
AUCKLAND.

Taranaki, Wellington, Hawke's Bay, Gisborne, Nelson, and Marlborough:
Rural Sociologist,
Department of Agriculture,
WELLINGTON.

Canterbury, Westland, Otago, and Southland.
Rural Sociologist,
Department of Agriculture,
CHRISTCHURCH.

FILL IN THE COUPON BELOW FOR YOUR COPY OF THE RURAL HOUSING SURVEY

The Rural Sociologist,
Department of Agriculture,
....

Please forward me........ copies of the questionnaire on Rural Housing.

Name:..
(Block letters)

Address:...
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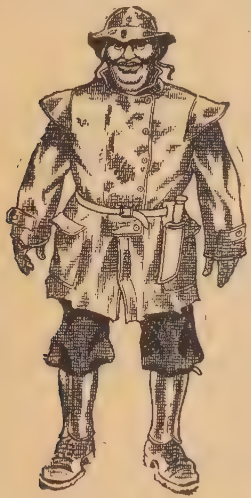
....

A Shooting Accident

By G. Thompson

MY brother Jim from the city was spending the first week of his holidays with us, and, bent on proving to him that life in the country could be just as full and exciting as that in the town, my husband had arranged with one of our Maori friends, Rui, to act as guide on a pig-hunting trip on the Saturday.

After a night of heavy rain the morning of departure dawned dull and cool. Lowering clouds moved sluggishly across the sky and the air felt damp with the threat of more rain. Undeterred, however, they decided to continue with their plans. Rui arrived at the appointed hour, clad in heavy boots, leggings, sou'wester, and an oilskin cut off at the knees. His only weapon, a sheathed knife, hung from his belt.



As my husband pulled on his boots, he called, "Rui, come round to the side of the house. Put your head through the window and see the new gadget I've got."

My husband's hobby is radio, and by the previous day's mail he had received a gramophone pick-up. As it was a new toy, he was justly proud and wished everyone to admire it.

Jim, surrounded by our three hero-worshipping youngsters, curbed his impatience by taking potshots at flying birds with a .22 rifle from the front verandah.

Meanwhile Rui, half in, half out of the window, was being initiated into the intricacies of the gramophone pick-up.

"What about a tune before we go?" I heard him ask, and in a few seconds the beautiful strains of a Strauss waltz came hauntingly through the air.

"Pretty good, eh?" asked my husband in satisfied tones.

"Pretty good, all right," answered Rui. "Now I think we better get away."

"I've just got to get my coat, and I'm ready," replied my husband. "Jim, are you ready?"

Rui withdrew from the window and walked round the side of the house toward the front verandah. My husband came out to the kitchen where I was putting away the last of the breakfast dishes. He picked up his coat. A shot rang out, then silence. There was something in that silence which made us look at one another questioningly.

"Oh, my God! Quickly someone, quickly. I've shot him," called Jim's voice.

We dashed out to the verandah just in time to see Rui, his face suddenly wrinkled and grey with pain, sink slowly on to the step.

"Jim—he shot me—through the thigh. Was an accident." His lips trembled.

"Yes, yes, my hand slipped," said Jim, white-faced and shaken. "I was unloading . . ."

"Never mind that now," answered my husband roughly, who was the only calm one present. "Get a couple of aspirins first." I fled to obey, glad to have something to do.

With visibly-shaking hands I held a cup of water to Rui's lips. The cup clattered against his teeth and water poured down his chin, but he managed to get enough to enable him to swallow the tablets.

"Now," said my husband, "we've got to get you inside somehow. Jim, you support one side and I'll take the other. Ready?"

Careful as they were in moving him, Rui almost fainted as they laid him on the bed. After a few moments a more natural colour returned and he smiled. "It's all right, Jim. I know it was an accident. Don't you worry."

Jim smiled wanly. He was still very upset.

"I'd better have a look at the wound," my husband said, beginning to unlace Rui's boots (fortunately I had previously spread an old rug over the bed), but this brought forth vehement protests.

"No, no! Don't take my boots off! Don't take my boots off!" Rui implored.

"It will be more comfortable," I said. "Why don't you want them off?"

"I—I just forgot to wash my feet last night and I haven't got any socks on," was the shamed reply.

"Oh, that's all right," I answered casually, but with difficulty suppressing a smile.

After an examination my husband said, "You're lucky Rui. The bullet has missed the bone. It has gone clean through the muscle and I can just see the tip of the bullet under the skin." Then he added, knowing the patient's almost fanatical dread of doctors and hospitals, "I could get it out quite easily for you if you like."

"No! no, don't touch it! I might bleed to death. I'll go to the hospital. The doctor will fix me," Rui replied quickly, covering the wound lightly with one hand. "You get my brother, Tara. He'll take me down to —— in the waka. You come, too. Tara can steer; you can paddle. You bring Tara here."

Tara came, and Jim explained, "Somehow my finger slipped on the hammer as I was unloading the rifle. I didn't know I had hit Rui until I saw his face when he came round the end of the verandah."

Tara nodded. He was slightly deaf and he held one hand behind his ear. His answer was a slow smile.

I made a much-needed cup of tea, which we drank while discussing the best method of taking Rui to the river a mile away. We decided the least painful way would be by sledge.

"I get the horse and bring the sledge," said Tara. "Might be a long time. The horse hard to catch."

"Oh, well, be as quick as you can. I think it's going to rain again," I answered, looking first at the sky, and then at the puddles of muddy water lying here and there, caused, I remembered in sudden panic, by heavy rain the previous day and night which would have made the river a swollen, roaring torrent. Quickly I tried to brush thoughts of danger aside by occupying myself in the preparation of dinner.

By this time various relations and friends had gathered who wished to see Rui, and hear repeatedly how the accident had happened. In an incredibly short time he had become a hero, and I think, despite the pain, was quite enjoying the experience.

My polished floors seemed a sea of footmarks etched in brown mud, but I was too worried to care because of a recurring picture of swiftly-moving, turbulent water flashing before my eyes.

After dinner Rui was helped on to the sledge, a mattress and several pillows adding to his comfort. Then began the slow journey to the river over the muddy track and through archways of clinging gorse.

At last we reached the landing.

"We will put this platform in the

A SHOOTING ACCIDENT . . .

middle of the waka," said Tara, "then Rui can lie on it."

"All right," said my husband, "It will be more comfortable than lying on the curved bottom of the waka. It will make the balance even, too, with you at one end and me at the other."

"Careful, there," called Tara warningly to my husband and Jim, who were helping Rui into the canoe. "It's hard to hold her steady. The current is strong even at the edge."

"Jim, you help Tara steady the canoe. I can manage here," my husband said.

"You know more about handling canoes than anyone in these parts, Tara," I said as I shook hands. "There's no need to tell you to take extra care today, I know," my voice trembled slightly, "but the river is very high, isn't it?"

"'Tis a bit high, but don't you worry. We get there safe. We be all right," he drawled in his slow, soft voice, and grinned confidently.

But as they stepped into the canoe, I noticed that both men had left their heavy boots unlaced.

The waka swung out into the current and gathered speed. I choked back a sob and blinked away quick tears, hoping that no one would notice. My trembling knees gave way suddenly, and I sank down on a fallen log. From dry lips a whispered prayer for the safety of the travellers winged its way upward. In my heart, too, were thoughts of the long hours to be lived through until Tuesday morning, before we would know for certain whether the men had reached their destination safely. "Oh! Time, Time, fly quickly. Fly on winged feet," I prayed.

We watched in silence as the tiny canoe grew smaller and was at last hidden by a bend in the river.

With heavy hearts and dragging steps we squelched our way home.

* * * *

On Tuesday long before the boat was due to arrive we were waiting at the landing. The morning was one of blue skies and crisp, keen air. The river had resumed its normal level and looked clear and sparkling in the warm sunlight. A thrush in full-throated song sat on a willow branch above our heads.

At long last we heard in the distance the familiar chug-chugging echoeing and re-echoing up and down the river. Ah! there was the boat coming round the bend. With eager eyes we strained to catch a glimpse of those on board.

"There he is, I think," I called, excitement and uncertainty making my voice squeaky. "No! it isn't. Jim, can you see? Is that Tara or my husband or neither?"

"Yes! there they are. See! They're waving," he answered.

I drew a deep breath of relief, although on the Sunday night I had decided that if anything untoward had occurred, surely someone would come up and tell us; but a small doubt had still lingered.

"We had a pretty good trip," Tara drawled, smiling.

"Yes! we had very little trouble," said my husband. "We called in at Kahui and they telephoned to Nurse to meet us at ——. We had one bad moment at Ngaporo Rapid. You know how the river curves like a snake in an 'S' bend, and how the water hurls itself against the granite bank in normal times; well, the flood water was crashing against the bank with a tremendous roar. It was Tara's skilful handling of the canoe that brought us safely round the first bend. Water splashed over us, drenching us to the skin. The current carried us straight for the opposite bank. Tara steered like a hero, but poor old Rui must have thought we were doomed. Pulling himself up and quite forgetting that it is Maori etiquette not to swear before respected pakehas, he yelled, 'Paddle, you b——s! Paddle you b——s! Paddle, I say!'

"We paddled, I can tell you. We needed no encouragement. Somehow, we shot round the bend, with nothing to spare, into smoother waters.

"The rest was easy going, and we arrived at —— to find Nurse waiting with her car to take us out to the hospital.

"As we stopped at the hospital Rui pushed two pounds into my hand, and whispered urgently, 'Buy me some pyjamas quickly. I don't want any Nurse to see me in bed without pyjamas.' But when I came back I found him comfortably in bed in a pair of hospital pyjamas, but still determined that he didn't want any nurses 'fiddling' about with him."

We all smiled broadly.

"I think that's all," said my husband, "What about getting home? I'd like a cup of tea."

Three Christmases

(From "A Thousand Sunrises," by Rita F. Snowden).

A LOVELY event, Christmas . . . And it will soon be Christmas again! In its short life our little country has seen the keeping of some remarkable Christmases—three in particular.

It was on Christmas Day, nearly three hundred years ago, that Abel Janszoon Tasman, the discoverer of New Zealand, came beating up the coast in his little wooden sailing vessel. Sad he was. Away to the south, some of the members of his crew had been massacred.

It happened that, to the north, he had just discovered a little group of islands; and because it was Christmas, appropriately enough, he named them The Three Kings—after those who long ago came paying homage to the new-born King.

Then again, a hundred and twenty-seven years on—and oddly, it was Christmas—came one, rediscovering, Captain James Cook. On Christmas night he was actually in the vicinity of The Three Kings. Great storms had buffeted his tiny vessel. For many anxious days and nights he had tacked to and fro. His thoughts? Of his native Yorkshire? Of the big log fires and the turkeys and the mistletoe? I think his thoughts would more likely be for the safety of his little boat. But who shall say?

Then came a Christmas—half a lifetime further on—perhaps the most wonderful of all; for on that day the Reverend Samuel Marsden preached the first sermon in this land. Strange cathedral his—the blue sky; strange choir—the nearby lapping of waves; strange altar; everything strange, except the one great message of the new-born King, as old almost as the fields of Bethlehem, and as strangely new.

Thus, on Christmas Day, 1814, our land heard its first sermon; and from the significant text, "Behold, I bring you good tidings of great joy." The little congregation sang the Old Hundredth, and a chief whom Marsden had befriended interpreted. The third of these memorable Christmases in New Zealand's story. And now, we are come again to Christmas, or Christmas is come again to us. How shall we keep it?

MARY'S AT HOME

WE really do enjoy your "At Home" in the "Journal." I feel as though I know "Tinkle Tinkle" and many others quite well. I loved the verse "St. Teresa's Bookmark"—it contains many sermons in one. No need for worry if we really believe that.

—"Jonathan," Clarence Bridge.

I HAVE had more fun in the vegetable garden this season than in the flower beds. It is miraculous the way tiny seeds so quickly become healthy plants, and I spend more time than I should just watching them grow. My small daughter has suddenly become extremely interested in the vegetable garden. I tremble to think of the day when the green peas are ready, but at least I will know where to find her! My cornflowers are in bloom in three shades of blue, and the new ranunculi have also flowered. They were a present from my husband—the kind of present I love most because its loveliness increases.

—"Native Flower," Waipukurau.

HERE is yet another wishing to join your "Good Neighbours." What a lot of newcomers you have had lately, and what a spirit of friendliness is shown in their letters.**—"Blue Eyes," Springston.**

MAY I join the "At Home"? I enjoy the pars, very much and they give me many happy moments. The coloured covers are most attractive.

—"Teddy," Te Kauwata.

IT is lovely to see so many new neighbours joining the circle and enjoying your interesting pages. I hope you are having better weather than we have had. A strong nor'-wester did great damage to the early flowers, especially the wallflowers, which have not regained their early promise. Polyanthi, wood hyacinths, ranunculi, and anemones are making a nice display at present, but the annuals will all be late this year.

—"C.V.W.," Dunedin.

MY four small children keep me very busy and allow me very little time for other pursuits. But I always try to keep a book at my bedside. What a treasure books are; with books and a vivid imagination one can travel the world of space and time, and life is never dull.**—"Rosemary," Levin.**

I DO appreciate colour in a garden, especially where there is a wide sweep of lawn to offset it. Violas are ideal plants, as they are so gay and bloom for such a long period. Sometimes I lose patience with the folk who go in for "show" blooms alone, scorning Nature's attempts. I think they miss something if they don't allow some of the plants to grow at their own sweet will.

"Cloudy," Ashburton.

MAY I join your ever-increasing circle of members? I do enjoy your pages. While my husband is engrossed in the various articles I admire the "Journal" covers. They are really lovely and like many of your readers I look forward to seeing the cover of each new issue.**—"Phillippa Anne," Te Awamutu.**

I AM interested in your "At Home" pages. We have taken the "Journal" for some time and have "signed on" for a few years. Son enjoys the farming articles. I find since he returned to New Zealand he is not so fond of stories—articles are more to his liking. I read all the recipes and try the ones I like. I think the built-in furniture is labour saving, but often wonder what we do with the bit of time we've saved. We never seem to do anything definite with it: we've so many irons in the fire.**—"Tussock," Otago.**

WHAT would you call a person who gets an inspiration while doing her housework and sits down and puts the inspiration into writing? Well, that's what I have been doing, and it's now eleven o'clock and all the beds are not made yet. Why worry; I've enjoyed myself, anyway! It is cold and dull here despite the nice weather report this morning. We had a frost two nights ago and I felt like weeping on beholding the rows and rows of potatoes and beans so badly frostbitten. Slugs and snails had also been busy, so last night I went out foraging and caught a number of them as they were crossing from outside the fence into the garden for their supper. I have never known a year like it for slugs; I have killed thousands and still they seem as numerous as ever.**—"Alix," Wairoa.**

I DO so much enjoy reading of the doings of my fellow Good Neighbours. My literary scrap-book is now nearing completion, and as it is reaching the stage of becoming bulky I shall have to continue in another. . . . The weather hasn't been too kindly disposed towards my flowers lately. The cold snap withered the lilac and the tender buds on the roses, as well as catching the plums, some of which now hang like raisins on the trees.

—"Clara Jane," Rakaia.

MAY I please join your "At Home," Mary? I do enjoy the friendly paragraphs and look forward to each new issue. I have a young family of four and find my life very full, but not so full that I cannot find a little time to read—my favourite pastime. Better to drown one's worries in a good book than air them to the neighbours.**—"Gipsy," Canterbury.**

I ALWAYS feel drawn to things in miniature. Is it the English in me? I'd like to be able to collect the silver filigree "dolls'" furniture that Queen Mary specially likes, or more of the miniature jugs. To go with those I have is a Doulton "gallipot," and a tiny copper saucepan (its mate, the frying pan, got lost. It was only three-quarters of an inch long, but beautifully proportioned).

I did some long-overdue weeding in the garden this morning and my fingers seem full of prickles. They will work out, no doubt, but are a

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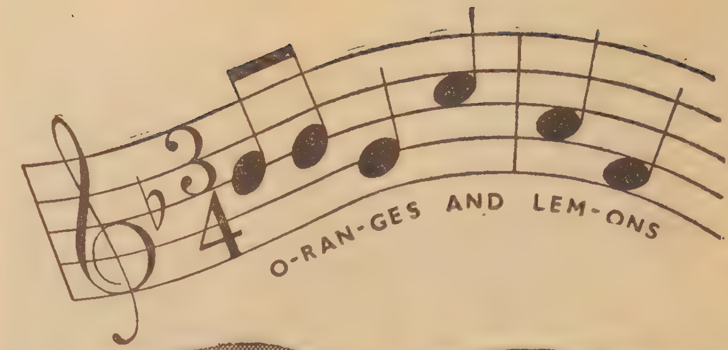


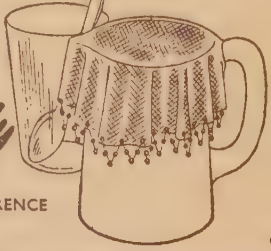
— fruits for fighting fevers

When feverish, the body cries out for lemon drinks, for oranges or for the old fashioned but good blackcurrant drink. Actually, the body knows *best* because these fruits or drinks provide Vitamin C which enables us to fight against fever conditions. For speedier recovery we should be given a Vitamin C fruit drink when our temperature rises, but even when we are free from fever it is up to us to build up OUR FEVER FIGHTING STRENGTH.

These are the fruits which are of value for their Vitamin C . . .

- Blackcurrants and red currants or blackcurrant juice.
- Rose hips made up into syrup, jam, powder or jelly crystals.
- Oranges, lemons or grapefruit.
- Gooseberries and Chinese gooseberries.
- Tree tomatoes and ordinary tomatoes grown in the garden.
- Sturmer apples.

Get your Vitamin 'C' regularly



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Issued by the Dept. of Health

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bit tender at the moment. We are afflicted, too, with that wild garlic which looks so pretty and smells so unpleasant! It's dreadful stuff for taking charge, isn't it?—**"London Lass," Wellington.**

I ENJOY your pages and try to imagine what the owners of the interesting pen-names look like. Anyway, they **sound** nice and some of their thoughts are really beautiful. Thank you for your friendly corner.
—"Clarabelle," Te Kopuru.

MAY I join your happy band? I have read the "Good Neighbour" section of the "Journal" for a long time now, but have never ventured to write.—**"Sunset," Timaru.**

MY husband and father-in-law built our home, which was a great accomplishment, as neither of them is a carpenter by trade and they built the place in their spare time. They employed a plumber and bricklayer only, and I, too, did my share of painting, staining, and varnishing. I also made the blinds and curtains for 22 windows.
—"Happy Mother," Blenheim.

THIS is the busiest time of the year on a farm: gardening, shearing, and dozens of other jobs are all wanting attention.—**"Cloudy," Ashburton.**

I WOULD like to become a member of the "Good Neighbour" circle. We live a few miles out of the city and have several acres of land, some of which is cultivated.—**"Smiling Thru," Auckland.**

WE loved the cover of the October "Journal." I am glad, however, that my pet lambs only number two this year and I don't have to compete with the land girl and her half dozen! We feed ours from a bowl, which is a bit messy, but is really quicker and simpler than the bottle method and easier to wash up afterwards.
—"E.W.," Waiheke Island.

I HAVE had a pet cat for about six years now. Strange to say, he loves to hear the bagpipes. Once when he was quite young he heard a pipe band concert over the air. Evidently he did not think the music was loud enough, for he jumped up on to the table beside the wireless and patted all the knobs until he struck the right one and obtained the right tone to suit himself. Then he jumped down and curled up by the fire to sleep.
—"Another Good Neighbour," Ward.

WE live right beside the Arapuni Lake. We have such a picturesque vista of the lake from our front door. We do not possess a boat, but my brother and I know the majority of the boats by name and are often given rides. There's Spitfire, Dawn II, White Wings, Salome, Velitoa, Oojacka, Arab, Blackie, Blue Peter, Moa, and numerous others. When some of these boats start up they almost deafen you—they are real "speeders" and go like shooting stars.—**"Bella Rob," Putaruru.**

IT was very nice to see a photograph of your room. It must be beautiful and so uncommon.—**"Tiare," North Otago.**

I ALWAYS look forward to your pages in the "Journal" and enjoy every line of them. For two years we lived right out in the country and how I enjoyed reading all the paragraphs from different readers—it was almost like having visitors for tea and talk, and it was grand to hear what subjects were of interest to others.—**"Tup," Ashburton.**

Child's Song of Christmas

My counterpane is soft as silk,
My blankets white as creamy milk.
The hay was soft to Him, I know,
Our little Lord of long ago.

Above the roofs the pigeons fly
In silver wheels across the sky.
The stable doves they cooed to them,
Mary and Christ in Bethlehem.

Bright shines the sun across the drifts,
And bright upon my Christmas gifts.
They brought Him incense, myrrh, and gold,
Our little Lord who lived of old.

Oh, soft and clear our mother sings
Of Christmas joys and Christmas things.
God's holy angels sang to them,
Mary and Christ in Bethlehem.

Our hearts they hold all Christmas dear,
And earth seems sweet and heaven seems near,
Oh, heaven was in His sight, I know,
That little Child of long ago.

AT last I am about to take up my writing again after having neglected it for a dozen years or more. Of recent years my time has been fully occupied with a young family, so washing lines have had to take the place of penned ones! What a pleasure to have time to write again.
—"Hot-Rot," Hawera.

HAVING spent 17 years on the land I am most interested in all things connected with the farming world. My husband and I are hoping to have a farm of our own some day. Near where we are living there is a river which flows out of the bush and eventually joins the Wanganui. I believe it has its origin near Mt. Ruapehu. Several years ago we went as far as the Mountain Hut, a walk of nine miles each way, mostly through enchanting bushland. Many of the trees were draped with beautiful white clematis in full bloom. It is only about two miles from the hut to the top of the mountain. The panorama before us was almost beyond description, and I wished very much that I had my camera. The whole trip was most interesting and I shall long remember it with delight.—**"Skylark," Ohakune.**

THE Maoris gave our district a name which means "Where the sun lingers longest," as the beauty of our sunsets will testify. The Tasman laps the shore of our lovely beach and behind Mt. Egmont in all her glory keeps guard over us. — **"Toodles," Oakura.**

I WOULD like to belong to your happy circle, too. Here is a quotation which my father wrote in my autograph book when I was a little girl. Though the book was lost the words stay with me—"He prayeth best, who loveth best all things both great and small.—**"Seven of Spades," Ngaere.**

PLEASE may I join your circle? I am very interested in books and music and these provide my favourite indoor occupations. I have just begun to learn the violin and hope that some day I will be able to entertain others as well as myself.—**"Barbara," Timaru.**

HERE is a recruit from the ranks of those who eagerly read your pages each month and in the subsequent enthusiasm decide, "I must try to do something for Mary's pages." But sad to say, after a few days the impulse has weakened into "I should have . . . " As an example, here am I now thanking "Isabel Emm" for an essay that I enjoyed in the September issue of last year entitled "Kumara Moon."—**"Haleakala," Nelson.**

I'VE just had a field day among the mending and with most of it finished I'm feeling much happier. I have to confess I am not a perfect housekeeper—far from it—and as I love not sewing, the mending is always a bugbear. It has an unpleasant habit of growing into a goodly pile and then in desperation I force myself to sit at it till I have cleaned it up once again. I won't say how many good resolutions to "mend" my ways" are made and broken!—**"Cloudy," Ashburton.**

I SHOULD like to use as my pen-name the one I used as a child when contributing to a children's page. Shall I ever forget the joy on receiving my first postal-note for a poem accepted! Busy years have passed, and though my time is fully occupied with my home and my three small boys, I feel I must take time to let you know how much your message means to me each month—the strength and beauty which lie in your words must be an inspiration to all "Good Neighbours."—**"Rakiura," Southland.**

THE "Journal" brings an added interest to the home. Having a young family makes outings rather difficult. Books are great friends though, and of course the radio keeps us in touch. I learn such a lot through the children's educational sessions and find them most entertaining, too.
—**"London Pride," Ashburton.**

WHEN I was six years old I received a dear little piano about a foot long and with black and white keys which tinkled merrily when I pressed them. I used to think of all the songs I knew and play them on my piano and ask my brother to guess them. Many times I sang myself hoarse. Sometimes at night my father would play the accordian, my brother would get his mouth organ, and I would join in with my piano.—**Isabella Robinson, Putaruru.**

RECENTLY I received a huge parcel of knitted jerseys, sox, underwear, and woollen skirts—did I have a wonderful time distributing them among my tribe of little ones! I also received three dozen prize gladioli bulbs from a "Good Neighbour." Next in order, a brand new wringer, and last, a big Christmas cake from another "Good Neighbour."—**"Martha," North Canterbury.**

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BAKING POWDER
Manufacturers: T. J. Edmonds Ltd., Christchurch.

46.6

I MUST mention a very special gift I received last Christmas. My eldest son, aged six, proudly presented me with one of his new pups. It was such a sacrifice on his part, and other mothers will know the joy that was in my heart that day.—**"M.B.M.," Invercargill.**

AMONG my presents was a bulky parcel wrapped in green cellophane and tied with bright ribbons. On untying the ribbon I found a little scarlet manuka in full bloom. You may not consider a tin-opener a very exciting gift, but for me the thrill was in the card attached, which read, "To Mum, with love from Santa Claus Junior"—it was from my schoolboy son.—**"Curly," Southland.**

SANTA Claus once brought me one of those gauzy Christmas stockings. It held the loveliest things. Right at the bottom were some sweets, then a brightly-coloured ball and a gaily-painted tin whistle. Next came a much-longed-for doll wrapped round by a picture book for protection. Several other things precious to a child were stuffed into that treasure store of a stocking, and outside was pinned a beautiful bon-bon. What fun we had pulling it and opening that wonderful stocking.
—**"Tui," Hawke's Bay.**

TO WALK IN PARADISE

He who would seek for treasure
In furrow or in field
Finds richer gems about his path
Than cities ever yield.

There, like a blue-starred carpet,
The periwinkle lies:
Deeper its shade, softer its hue
Even than angels' eyes.

Leaning above it twines a rose
About an elderberry stem.
Which is the lovelier, none can tell—
Both were brushed by Beauty's hem.

He who goes seeking treasure
Needs only open eyes.
A thankful and a wondering heart
To walk in Paradise.

—M.E.T.

DURING my school days I craved for a pocket knife. The one I received was in the form of a pencil with a slit at one end. You pressed the other end and the knife appeared. I was also given a pair of folding scissors.

Some years ago my family saved up and gave me a small magnifying glass as a Christmas gift. I had often wanted one when looking at snaps, so I valued it very much. Last Christmas brought me a cameo necklace from Italy. I was thrilled with its beauty and more so by the fact that Son had remembered.—**"Matau," Milton.**

The Flower Garden in January

By J. P. HUDSON, *Horticulturist, Wellington.*

LITTLE planting is done in flower gardens in January, as dry, hot weather makes conditions difficult for new plants to establish themselves. There is, however, plenty to be done to maintain a bright display of flowers for the late summer and autumn, and cuttings of many flowering plants taken now will root rapidly in a cold frame and produce good plants to flower next year.

BIENNIALS, such as wallflowers, Canterbury bells, hollyhocks, forget-me-nots, and sweet Williams, may now be sown in the warmer districts in a part of the garden where they will not be in full sun. When the seedlings are large enough to be handled they should be pricked out a few inches apart in a nursery bed to make bushy, well-rooted plants to put out later into the beds where they will flower next year.

Christmas lilies (*Lilium candidum*) can best be moved as soon as the old flowering stem has turned yellow and the leaves have withered. At this season the bulb is almost dormant, but soon starts to root again and send up a new rosette of leaves, after which these lilies can be moved only at the risk of losing next season's flower spike. The nose of the bulb should be planted not deeper than 2in. below the surface. Christmas lilies can be increased rapidly by detaching scales from the bulbs and inserting them upright in boxes of sandy soil, with the tip of each scale just below the surface. Keep the boxes moist, preferably in a cold frame, and plant the scales out when they have rooted. Plants produced in this way should flower in the second season after planting.

Flowers which have faded should be picked off regularly to prevent them from going to seed, as seed formation often leaves plants with insufficient energy to form further flowers. This applies especially to annuals, the flowering life of which can be considerably extended if dead flower heads are picked off regularly.

Gaillardias should be grown in every garden, as they bloom freely and make a bright show, especially in hot, dry weather, and in poor or sandy soils where few flowers will flourish. Seed can be sown now and the seedlings later planted out into the borders in warm, well-drained, sunny places where they will flower next spring. On heavy, rich soil they do not always winter successfully, and in such places they are best raised by sowing the seeds in boxes in spring and planting the seedlings out in October. An interesting method of multiplying gaillardias is to dig up plants in the autumn and cut the fleshy roots into pieces 1½ to 2in. long, making sure that the end of each root cutting which was nearest the crown is cut off square and the other end with a slanting cut. Put the cuttings upright and 2in. apart in sandy soil with the square end just below the level of the soil. By spring each root cutting will have produced roots and buds and can then be planted out in the usual way.

Iceland poppies: Experience in Wellington Province has shown that there is no advantage in planting out Iceland poppies until the end of February or March, as earlier plantings may become very heavily infected with spotted wilt virus disease. Commercial beds planted earlier than this have been known to show such a high infection that they were ploughed in as useless. Seed should be sown in January in boxes which should be kept in a shaded position, covered with paper, and moistened when necessary until the seedlings show, when the paper should be removed. When the seedlings are large enough to be handled they should be pricked out into boxes and later planted in a well-limed bed which should not have been newly manured. This late planting will produce strong plants which will flower well late in the winter and next spring.

Peonies and pyrethrums become relatively dormant for a time after flowering. If they are becoming overcrowded, or more plants are required, the clumps can be split up and replanted in January or February. The newly-planted crowns must be watered freely in dry weather until they have formed a strong root system. Peony roots are fleshy and should not be injured more than necessary when they are divided. Tree peonies, which resent being transplanted, are propagated by grafting and not by dividing their roots.

Propagation of flowering shrubs is an important item in January's work. Budding of roses can continue as long as the bark on the stocks lifts freely. Layer rhododendrons by bringing down each suitable branch and burying it in a trench in such a way that the tip projects above ground and the branch is bent sharply to form an elbow a few inches below the surface. On the sharpness of this elbow, which checks the flow of sap, the successful rooting of the layer depends. The layer should be rooted and ready to separate from the parent in 1 to 2 years, depending on the climate. It is better to bury the branch in a trench than under a mound of soil, as a mound dries out too easily and requires watering. Cuttings of new side shoots, each a few inches long and cut off with a small heel of older wood, should be taken as soon as they are long enough from *Buddleja* (*Buddleia alternifolia*), mock orange (*Philadelphus spp.*), Deutzias, Forsythias, *Diervilla* (*Weigela*) *spp.*, and many other flowering shrubs. The cuttings must be prevented from flagging, and are therefore best inserted in a frame or propagating pit, where the atmosphere can be kept moist until the cuttings have formed roots. A gritty, open soil containing plenty of sand is best for striking cuttings. Silty soils which "run" and form a crust on the top when they are watered are useless for propagating.

Pruning of shrubs which have flowered on last year's shoots should be attended to as soon as the flowers fade by removing as many as possible of the shoots which have borne flowers this year. That ensures that plenty of vigorous shoots are produced to flower next year. In the case of shrubs

[*Photo News Ltd.*

Christmas lilies are almost dormant for a short time after the flower stem dies down. This is the best time to move them, before new leaves start to grow and the bulbs reroot.

Hydrangeas root readily from cuttings taken from the ends of non-flowering shoots.

which flower in summer, it is not usually practicable to cut off all the flowering shoots (as is advised for the spring-flowering jessamine, for instance), as one or two strong new shoots are likely already to have grown on some of the branches which have flowered. These new shoots may be required to keep the bush shapely and well furnished with new wood and should not be removed. *Diervilla* (*Weigela*) *spp.*, Deutzias, and mock orange are shrubs which should be pruned in this way as soon as the flowers have faded.

Hydrangeas root readily from cuttings taken from the end of new shoots, trimmed off with a sharp knife just below the bottom bud, then inserted in a cold frame and watered in. Cover the cuttings with a sheet of newspaper for a few days to shade them from the sun, and keep the atmosphere moist. Most propagators cut off the bottom two leaves close to the stem and also cut off about half of the leaves which remain.

Sawdust is proving a valuable form of mulch to apply to the soil in a layer several inches thick around rhododendrons, azaleas, and many other flowering shrubs, especially on heavy clay soil. Sawdust from *Pinus radiata* (*insignis*) is preferred, as it rots more quickly than other types. Though some gardeners use it fresh, others prefer to leave it until it goes brown before using it. It is certainly less unsightly when it is darker in colour.

Seed saving from home-grown flowers can add interest to home gardening, though the seeds will not necessarily produce plants similar to their parents. As a general rule, especially with uncommon alpine plants, the seed pods should be collected as soon as they are ripe, put in trays for a few days to dry off completely, and then opened or crushed to liberate the seeds. The chaff should then be separated as far as possible and the seeds sown at once; many seeds which will germinate quickly if sown as soon as they are ripe will be slow in germinating if they are kept a month or two before being sown. By early sowing sturdy plants can be produced before the cold weather sets in.

Staking and tying dahlias, chrysanthemums, and other tall herbaceous perennials must not be neglected. If large blooms are required for show purposes, all flower buds but one should be removed from each stem and the plants should be fed regularly either with a topdressing of complete fertiliser or, preferably, with dilute liquid manure. If the soil is dry they should also be watered regularly, as first-class blooms can be produced only by plants which have always had sufficient water at their roots. Moreover, topdressings of fertiliser are of no assistance to plants unless the materials are washed down into the soil and dissolved in the soil water.

Reminders About Common Troubles

Narcissus fly is a serious pest of narcissi and daffodils. The fly lays its eggs near the base of the dying leaves or in the hole which is left in the soil when the leaves die down. The young larvae work down to the bulbs, which they enter through the base, and then feed inside the bulbs, which are ruined. Cultivating the soil to keep it close to the fading leaf bases, and to close up the holes left by the leaves when they die, does much to reduce the severity of an attack by making it difficult for the young larvae to reach the bulbs. When narcissi bulbs are lifted they should never be left lying about on the soil or in trays outside, as that gives the flies an opportunity of laying their eggs directly on the bulbs. All bulbs which feel soft should be burned; they probably contain larvae of the flies.

Rose mildew commonly attacks roses, especially ramblers, growing on the side of a house or in a position where air does not circulate freely round them. A reasonable control of this disease can be obtained by dusting the plants with flowers of sulphur. An easy way of dusting is to enclose a handful of the flowers of sulphur in a piece of fine muslin, hold it near the plants, and tap the bundle smartly with a stick, when a cloud of the dust will be ejected.

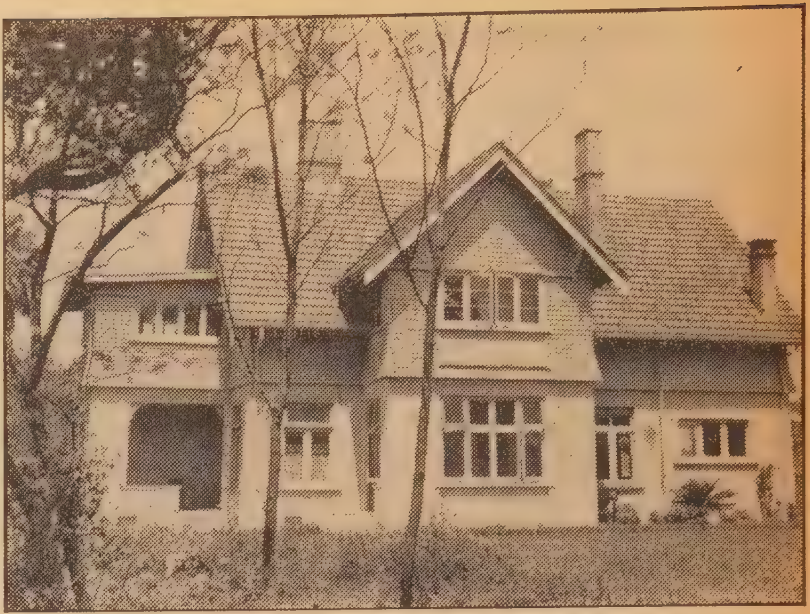
Thrips, which are slender, elongated insects up to 1-10in. long and ranging from yellow to brown or black in colour, often seriously attack gladioli. The adults are winged and fly freely, but in the younger stages the insects are wingless. The insect feeds by puncturing the leaves and petals to obtain the cell sap, and in doing so produces a characteristic silver or brown, scurfy appearance on the surface of the parts attacked. If the insects feed on the flower buds, these may look "scorched" and the petals may be unnaturally streaked. Thrips are often carried over from season to season in the corms, which should be kept free from the pest while in storage by dusting them with naphthalene flakes. Careful search for thrips should be made on the developing leaves and flowers at frequent intervals during the growing season, or serious damage may be caused before it is noticed. Regular spraying with nicotine sulphate (black-leaf 40) will keep the pest in check and ensure that the blooms are not disfigured by its attacks. (Nicotine sulphate spray is made up by dissolving 2oz. of soap in a little hot water and adding it, with 1 fluid ounce of nicotine sulphate, to 4 gallons of water.)

Te Rahui—"Coming Together"

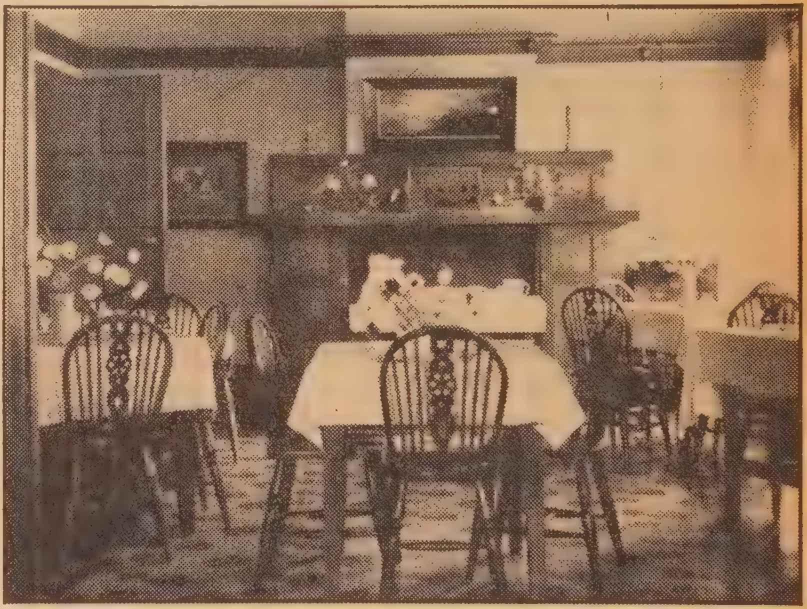
"HAEREMAI! Haeremai!" were the first words which greeted me as I neared the threshold of Te Rahui, the Maori Centre and Girls' Hostel in Hamilton. It was indeed an appropriate welcome to the centre of Maoridom, for in Polynesian mythology the North Island was known as Te Ika a Maui, the Fish of Maui, and the Waikato is the Heart of the Fish. Situated on the western bank of the winding, tree-fringed river, the Te Rahui property was given its name (which means "coming together" and is often mentioned in ancient waiatas) by Princess Te Puea Herangi, C.B.E., leading member of the advisory committee.

THE focal point for social gatherings and communal activities is the assembly hall, and it is so admirably equipped that there are even sleeping quarters for visitors who wish to stay overnight. The hostel, formerly a doctor's residence, is a handsome, high-gabled building which is not only architecturally pleasing but particularly suited to its present use. It provides accommodation for 18 girls, the ages of the current group of boarders ranging from 10 to 20 years. The wide entrance hall has a long, cushioned seat and chairs enough to convert it into a comfortable sitting-room if the need arises. The windows are curtained in silk the colour of sunshine, and a similar touch of gold is repeated here and there in the carpet. The picture of a venerable chief, by the gifted portrayer of Maori life C. F. Goldie, smiles happily from the wall, his tattooed features and greenstone eardrop presenting a striking contrast to his conventional European garb. The adjacent rooms contain some fine examples of the work of Bessie Blomfield, outstanding among them being a river scene with war canoes in the foreground; a bullock wagon toiling along a mountain road; and a seascape solely in tones of blue save for a pale yellow moon breaking through the clouds. Broad frames of dark wood set off these oils to advantage, and I greatly admired one carved in a design of leaves and acorns.

The far end of the room has its own fireplace and radio, and forms a convenient dining alcove with its complement of small tables for 4 or 6. These can be arranged end to end to make one big table when a birthday or some other event is being celebrated. Both here and in the lounge the flower bowls were freighted with colour and fragrance. In fact, the only empty vases I could see were the bronze pair guarding the portrait of Princesss Te Puea. These were brought from Egypt, as were the other ornaments on the mantelpiece—a pottery jar with a lizard for a lid; the head of a Pharaoh modelled in stone; two tiny bronze obelisks; a graceful jug; and a little ebony elephant with a medium-sized companion. A third elephant, much more amply proportioned than the others and with a mahout and passenger on his back, was quartered next to a large globe in the room of the principal. Her most prized possession, however, is a much-travelled korowai, a cloak woven from muka (flax fibre) and adorned with twisted thrums dyed black in the Maori manner by being buried in a special kind of mud for 2 or 3 days. Before going upstairs I peeped into the kitchen with its twin gas stoves, artistically-grained rimu cabinets, and a work-table



The main building of the Maori Girls' Hostel, Hamilton.



The dining room at the hostel.

scrubbed to a spotlessness that would delight the heart of any housewife.

The window above the stair landing looks out on to a boundary trellis covered in honeysuckle and climbing roses, and every room has its garden vista. The generous closet space allotted the girls for their clothes results in a high standard of tidiness, but there were sufficient of their personal belongings about to counteract any suggestion of austerity in their surroundings. In one room a piu-piu and plaited headband were utilised as a wall-decoration; in another, a scarlet and white lei suspended from the lamp-bracket rivalled the striped woollen coverlet for gaiety; in a third, shell necklaces from Hawaii and a gold-framed photograph of Princess Te Puea and King Koroki and his wife indicated the identity of their owner, the daughter of the Maori King. The 16-yard length of tapa cloth serving as a bedspread in the neighbouring room had been used long ago in a ceremony connected with the reigning house in Tonga. Soft to the touch and warm as a blanket, the tapa "quilt" had among its geometric patternings of reddish-brown birds and palms the inscription in Tongan: "Honoured by Your Majesty." It originally belonged to a cousin of Queen Salote, and he presented it to his daughter on her sixth birthday. This girl, I discovered, was the maker of the leis. So expert is she at the art that she can complete one in as little as 15 minutes. She proudly showed me some of her latest creations which, being of cellophane, in bright reds and greens, or pink and blue combinations, are not only as pretty but much more lasting than the customary flowers.

THE SINGING HOUSE

Everywhere there was the sound of singing,
Silver-sweet as the breath of dawn—
Flowers that swayed with laughing music,
Grass astir on the dew-bright lawn.

Loud was the chorus of birds at evening,
But in the silence, all night long,
Dream-like, hushed as a starlit river,
Gently rippled the stream of song.

Gossamer music, soft as slumber,
Notes from a thousand muted strings,
Soul of the dancing light and shadows,
Filling the home of the heart that sings.

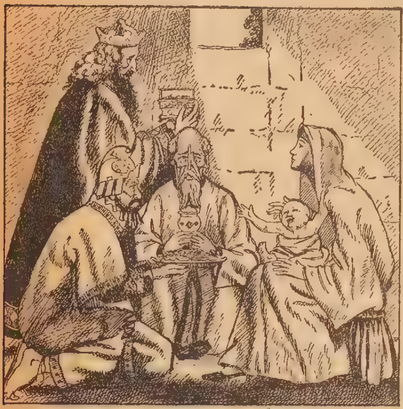
—Jean H. Mather.

I should like to have spent longer in the reading room under the eaves—the numerous tables with their opened newspapers looked so inviting. The Encyclopaedia Britannica made an impressive array in the main bookcase, and volumes of Dickens and Burns and George Eliot rubbed shoulders with those of Conan Doyle, H. G. Wells, and H. V. Morton. Further along the shelves I noticed Cowan's "Folk Tales of the Maori," Shrimpton and Mulgan's "History of New Zealand," and several of Rita Snowden's books.

Before I said my farewells I was escorted round the grounds. Such is the gardening enthusiasm of the staff that not a weed was to be seen, even in the big vegetable garden with its orderly rows of beet and cabbage, peas and beans, lettuce and onions, and all the flower beds were a riot of colour. At the far edge of the lawn the land dropped suddenly in a steep bank which had been planted with hydrangeas and lilies, variegated pinks, and African daisies, whose vivid blooms were enhanced by leafy cuttings of chrysanthemums set out ready for autumnal flowering.

Truly a beautiful meeting-place where our Maori friends may "come together" in happiness and harmony is Te Rahui, beside the green waters of the Waikato.

THE THIRD GIFT



CLIPPETY-CLOP, clip-clop, sounded the feet of three camels making their way along the stony road down from Jerusalem. It would not have been so had it been but a short time before; in the trackless desert their tread had been almost noiseless—just a soft "pluff" in the sand as they kept their steady pace under the starlit sky.

Now, at a bend of the road, the riders of two of them, who had been in earnest conversation, paused to wait for their companion, who rode a little to the rear.

"Caspar, my friend, I have been thinking of our quest and am doubtful, after all, if it is worth pursuing. These many nights have we travelled, bearing our gifts—brought by nothing stronger than our faith in the leading of the Star. And before we have found the baby King we have seen King Herod, a cruel and suspicious man.

"Would it not be better to return to Jerusalem, give him the golden gift, and reach our own country while we are safe?" Melchior ceased, and nodded to Caspar to speak.

"I, too, am no longer as hopeful as I was," he said. "My gift is frankincense—the desire to worship. Is it not foolish, grown men as we are, with all our wealth and power, to kneel to a Babe, however great the Scriptures say his life will be? Would it not be better to turn our backs upon the Star altogether?"

Balthazar's camel drew near, and before he replied he bade it kneel while he dismounted. Bewilderment, and then grief, showed in his eyes as he gathered the purport of their words.

"My brothers," he said, "while these thoughts were in your minds, and my camel walked because of its slight lameness, my heart was warm with the thought that soon we should see the baby King and give Him our gifts. You are tired, I know. Yonder is a well, close to the village of Bethlehem. Will you not come and rest beside it, while I draw water for the camels?"

He led the way, followed by his two companions. "He has been thoughtful and kind throughout this long and dangerous journey," Melchior mused aloud. "His steady eyes betoken a quiet heart. Nothing, I am certain, could shake his faith in the leading of the Star. He has no fears of Herod, and his heart is as simple and steadfast as a child's. Perhaps he is right and we are wrong."

Caspar, as he listened, had been looking down into the still, dark depths of the well.

.."See, oh see!" he cried suddenly, pointing down. "The Star! It is mirrored here—as indeed it should be in my own heart. My brother, let us tell Balthazar, and hasten to Bethlehem to seek and find the King!"

Melchior needed no second bidding. Quickly they remounted, and set off at once, their eyes fixed eagerly once more upon the Star.

Clippety-clop, clip-clop, went the camels' feet once more, until they reached the inn.

And when Melchior, Caspar, and Balthazar knelt before the baby King, lying so happily in his gentle mother's arms, who shall say that the third gift —an understanding heart—was not most precious of them all.

—"London Lass," Wellington.

THE SKYLARK

THE peace, beauty, and solitude of the open spaces will ever have a strong hold upon me. I have found the greatest satisfaction and contentment there and have no desire to spend my days in crowded areas. It often happens that if I care to listen I hear the skylark's song. This prose poem, written by George Johnstone, may appeal to some of you:—

"When the little skylark soars aloft towards the skies of blue; when it sings its cheery song as comes the dawn, its melodious, joyous carolling is sung for me and you, and it brings new cheer to those whose hopes have gone. For it nears the gates of heaven, where it seems to intercede for the lonely, and the weary ones on earth, and the tiny skylark's plea, be sure, is heard on high, indeed, by the great Creator there, who gave it birth.

"As it swiftly drops down earthwards to its lowly, humble nest, it anticipates the rest and joy of home. It has sung its hymn of gladness; it has given us of its best, as its joyful strains reached earth from heaven's dome.

"When the morning sun is shining, when we walk the busy street, there should be a song of gladness in each heart; we should welcome with a genial smile each well-known friend we meet, so that we, too, like the lark, may do our part. There are many who are lonely; there are those whose hearts are sad; and they love to see our smile and hear our song. Smiling eyes will give them courage; kindly words will make them glad as they face life's road and bravely trudge along.

"And at evening, when home returning to the mansion or the cot, like the little skylark, keep on singing still. Though the home be poor, you can still be contented with your lot; every soul can still be happy if it will.

"Keep on counting up your blessings, and a song your heart will know. They outnumber all your ills, though they are great. And the lark's song will be blended with your praises from below, and your carol will be heard at heaven's gate."

—"Skylark," Ohakune Junction.

"The Sign of the Takahe"

WHILE I was on holiday in Christchurch I was taken for a delightful drive to the Cashmere Hills and up the Summit Road, 624ft. above sea-level. The late Hon. H. G. Ell wished to secure this very beautiful road "as a permanent asset for the common good and pleasure of the people of the city for all time; to ensure the preservation of the native bush through which the Summit Road passes; to protect the native bird life; and last, that the people using the road may have the pleasure of journeying in stages, to build up the roadside houses for the refreshment and accommodation of travellers."

The road itself is 53 miles in length, rising to a height of 2,800ft. above sea-level, and reaches to Akaroa. The Christchurch starting point is the roadside house named "The Sign of the Takahe." Built of stone it resembles an English castle. Coats of arms and heraldic designs adorned the walls of the room where we had tea and there was a handsome stone fireplace. From the quaint diamond-shaped windows we had a wonderful view of the Canterbury Plains, the Southern Alps, the Waimakariri River, and the city of Christchurch itself.

—"Cheerio," Te Rore Bridge.

MORNING PICTURE

A FLOWERING cherry and a magnolia tree are in bloom in the front lawn of the garden opposite ours. Add to this loveliness the clearcut magnificence of Mount Egmont, which can be seen between the two trees from the angle of my bed, and you share my perfect morning picture—a delicate study in white against the pale blue sky of early spring.

—"Bry," Eltham.

The New Zealand Journal of Agriculture
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INDEX

A

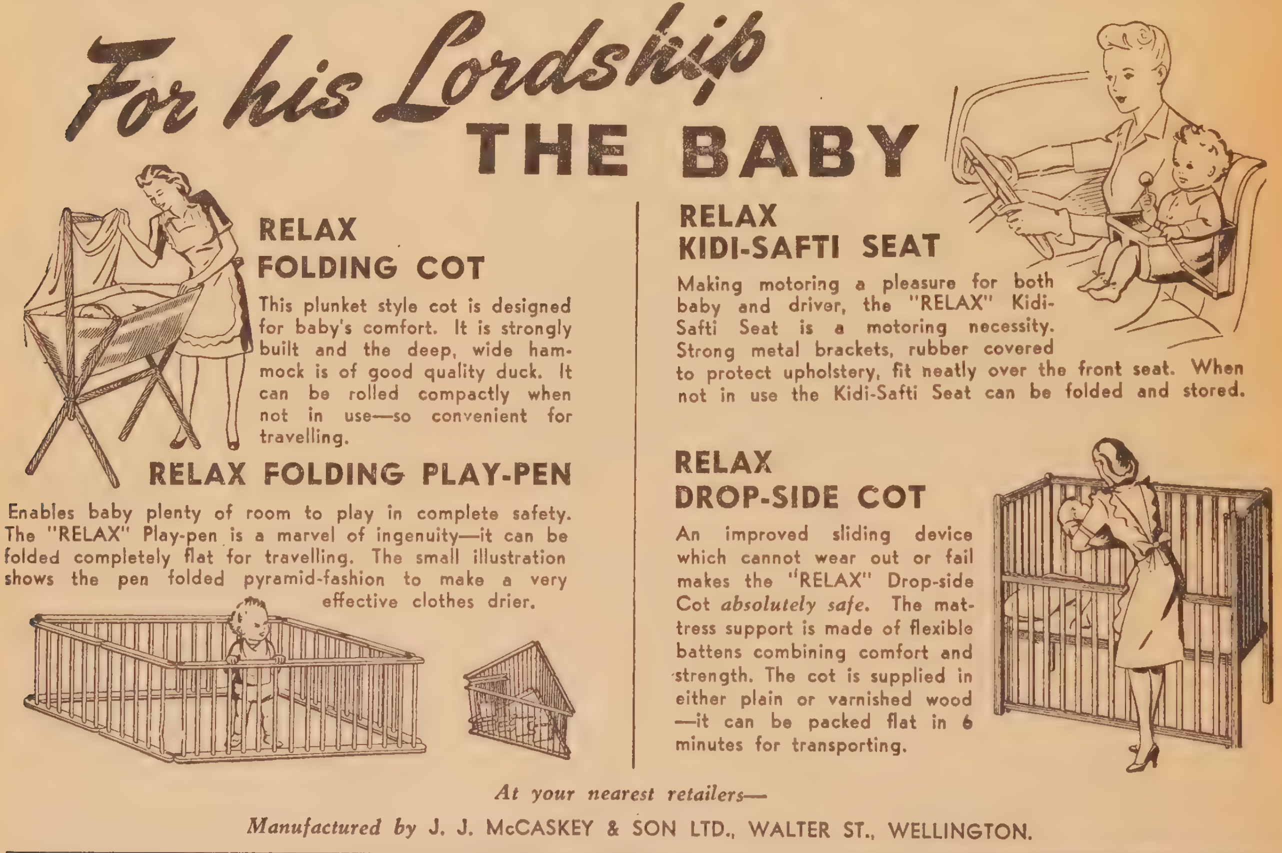
Abortion, Contagious, Vaccination against, 457.
Adamson, N. J.—Establishing a Tobacco Farm, 37.
Air, Bluestone Topdressing from the, 193.
Alexander, R. E.—Care of Ewes and Lambs during Lambing, 119.
Allo, A. V.—The Feed Taint Problem, 15.
Anderson, O. J. C., and Cunningham, I. J.—Bluestone Topdressing from the Air, 193.
Apiaries, Selection of Sites for, 249.
Apiary, the Value of Nucleus Hives in the, 327.
Aprons, Useful, from the Ragbag, 79.
Arnold, E. H.—
  Cropping for Pigs, 73.
  Farmyard Manure, 151.
  Maize, 59.
Arrangement of Furniture, 487.
Arsenate Sprays and Bees' Part in Setting of Fruit, 345.
Attractive Meals Without Meat, 174.
Autumn-sown Pasture, Preparing Land for, 536.
Avocado Culture in New Zealand, 129.

B

Backgrounds: Wall and Floor Coverings, 591.
Baled Hay, Methods of Stacking, 533.
Bale Elevator, an Efficient, 562.
Banfield, G. L.—An Efficient Bale Elevator, 562.
Beekeeping in North Auckland, 447.
Bees, Bottle Type Feeder for Feeding, 120.
Bee Smoker, the, 63.
Bees' Part in Setting of Fruit, 345.
Binfield, R. E.—Reworking of Pip Fruit Trees, 155.
Biscuits and Cakes for Christmas, 477.
Blake, G. A.—
  Harvesting of Cereal Crops, 561.
  Making Good-quality Hay, 453.
Bluestone Topdressing from the Air, 193.
Bobby, F. C.—
  Management of Growing Poultry Stock, 339.
  New Zealand Flock Improvement Plan, 405.
  Standard Poultry Mashes, 231.
  Table Poultry Plant, Upper Hutt, 121.
Boot, V. P.—Studies in Farm Management: A Poverty Bay Hill-country Farm, 519.
Boron in Fruit Trees, Curing Deficiency of, 456.
Bottle Type Feeder for Feeding Bees, 120.
Boxthorn Hedge Cutter, Mechanical, 579.
Brash, A. G.—Gid: A Comparatively Rare Parasitic Disease of Sheep, 397.
Broom Corn Millet, Danger in Grazing, 243.
Brown, I. L.—Curing Deficiency of Boron in Fruit Trees, 456.
Budwood, Citrus, Needs Careful Selection, 257.
Build up Your Feed Reserves, 361.
Built-in Furniture, Modern, 271.
Bulk and Mother Culture Starter Apparatus, 359.
Bulk Distribution of Lime, 39.
Bull, Pedigree, Death of, 457.
Bull, Warts on a, 396.
Burgess, A. C.—The Carrot Crop in New Zealand, 333.
Burns, Second-growth, Establishing Pastures on, 357.

C

Cakes and Biscuits for Christmas, 477.
Canning, Growing Peas for, in Nelson Province, 145.
Canning, Growing Peas for "Quick Freeze" and, 233.
Carcasses of Pigs, Avoiding Damage to, 261.
Care of Ewes and Lambs during Lambing, 119.
Care of Farm Implements, 113.
Carrot Crop in New Zealand, the, 333.
Case End Brander, 424.
Case-lining Bench, 431.
Cattle Pumpkins, 245.
Cattle, Woody Tongue in, 25.
Cereal Crops, Harvesting of, 561.
Certification, Seed Wheat, Extension of, 507.
Christmas, Cakes and Biscuits for, 477.
Chrysanthemums, Combating Pests and Diseases of, 91.
Citrus Budwood Needs Careful Selection, 257.
Citrus Trees, Manuring of, 57.
Citrus Types, Improved, May Come from "Sports," 344.
Claridge, J. H.—
  Extension of Seed Wheat Certification, 507.
  Lucerne, Seed, 170.
  Seed Maize, 149.



For his Lordship
THE BABY

RELAX FOLDING COT

This plunket style cot is designed for baby's comfort. It is strongly built and the deep, wide hammock is of good quality duck. It can be rolled compactly when not in use—so convenient for travelling.

RELAX FOLDING PLAY-PEN

Enables baby plenty of room to play in complete safety. The "RELAX" Play-pen is a marvel of ingenuity—it can be folded completely flat for travelling. The small illustration shows the pen folded pyramid-fashion to make a very effective clothes drier.

RELAX KIDI-SAFTI SEAT

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- Clover, Subterranean, Direct Heading of, 582.
- Clover Swaths, Device for Lifting, 408.
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- Coccidiosis of Poultry, 515.
- Colour in the Home, 373.
- Combating Fleas in the Home, 492.
- Combating Pests and Diseases of Chrysanthemums, 91.
- Combating Potato Tuber Moth, 438, 517.
- Conserving Soil Moisture in the Orchard, 510.
- Contagious Abortion, Vaccination Against, 457.
- Control of Grass around Beehives, 584.
- Cottier, K., and Lynch, P. B.—Selective Weedkillers, 105.
- "Cow, Better Educated," Plea for, 433.
- Cream and Milk Standards, Maintaining, 393.
- Cropping for Pigs, 73.
- Crops, Winter Pig Feed, 338.
- Crosbie, C. J., and Scott, R. H.—Bulk Distribution of Lime, 39.
- Cultivation and Grafting, 71.
- Culture of the Feijoa, 465.
- Cunningham, I. J., and Anderson, O. J. C.—Bluestone Topdressing from the Air, 193.
- Curd for Feeding Pigs and Poultry, 417.
- Curing Deficiency of Boron in Fruit Trees, 456.

D

- Dairy Heifers, More, Wanted, 20.
- Dairy Heifers, Raising on Fat Lamb Farms, 19.
- Dairy Instruction, Farm, 303.
- Danger in Grazing Broom Corn Millet, 243.
- Davies, J. E.—Mechanical Boxthorn Hedge Cutter, 579.
- Death of Pedigree Bull, 457.
- Developing a Pumice Land Farm, 305.
- Device for Lifting Clover Swaths, 408.
- Dingwall, A. R.—Studies in Farm Management: A Taihape Sheep Farm, 399.
- Direct Heading of Subterranean Clover, 582.
- Discolouring of Preserved Fruit, 177.
- Disease of Sheep, Gid: A Comparatively Rare Parasitic, 397.
- Diseases, Orchard, Plant and Sprays for, 49.
- Drainage, Mole, 253.
- Dry-weather Gardening, 315.

E

- Early Spring Harrowing of Pastures, 156.
- Effect of Cooking on Food Values, 83.
- Efficient Bale Elevator, an, 562.
- Elevator, Bale, an Efficient, 562.
- Elliott, I. L., and Parkinson, N. M.—
  - Tree Felling and Splitting, 157.
- Establishing a Tobacco Farm, 37.
- Establishing Pastures on Second-growth Burns, 357.
- Everett, P.—Manuring Citrus Trees, 57.
- Ewer, T. K.—
  - Winter Feeding of Ewes and Summer Fattening of Lambs in Canterbury, 409.
  - Winter Feeding of Hoggets in Canterbury, 559.
- Ewes and Lambs, Care of, During Lambing, 119.
- Ewes, Winter Feeding of, in Canterbury, 409.
- Extension of Seed Wheat Certification, 507.

F

- Farm Dairy Instruction, 303.
- Farm Implements, Care of, 113.
- Farming in New Zealand: Subsistence Farming, 537.
- Farm Management, Studies in, 27, 203, 319, 399, 519.
- Farm Work for August 47, September 135, October 225, November 343, December 439, January 557.
- Farmyard Manure, 151.
- Fat Lamb Farms, Raising Dairy Heifers on, 19.
- Feeding Bees, Bottle Type Feeder for, 120
- Feed Reserves, Build up Your, 361.
- Feed Taint Problem, the, 15.
- Feijoa, Culture of the, 465.
- Felling and Splitting, Tree, 157.
- Fertiliser Rationing, 171.
- Fertilisers, 1.
- Filmer, J. F.—Vaccination against Contagious Abortion, 457.
- First Aid Notes, 265, 383, 485, 586.
- Fischel, W. G.—Coccidiosis of Poultry, 515.
- Flax Stripper, 396.
- Fleas in the Home, Combating, 492.
- Floor and Wall Coverings, 591.
- Flour, the New, 177.
- Flower Garden Notes, 91, 95, 178, 287, 384, 481, 601.
- Fodder Reserves, Making Best of Pastures for, 425.
- Food Habits, Influence of, 277.
- Food Values, Effect of Cooking on, 83.
- Foy, H. A., Appointment of, as Director of Dairy Division, 247.
- Frew, S.—
  - Harvesting the Stone Fruit Crop, 571.
  - Plan for Efficiency in the Orchard, 227.
  - Soil Management in the Orchard, 329.
  - Thinning of Fruit Crops, 424.
- Frocks for Very Young Girls, 377.
- Fruit, Bees' Part in Setting of, 345.
- Fruit Crops, Thinning of, 424.
- Fruit Trees, Curing Deficiency of Boron in, 456.
- Fruit Trees, Pip, Reworking, 155.
- Fruit Trees, Young, Protecting from Rabbits, 426.
- Furnishing the Home, 179.
- Furniture, Arrangement of, 487.
- Furniture, Modern Built-in, 271.

G

- Geddes, H. J.—Plea for "Better Educated Cow," 433.
- Gid: A Comparatively Rare Parasitic Disease of Sheep, 397.
- Girls, very Young, Frocks for, 377.
- Glanville, E. B.—
  - Build Up Your Feed Reserves, 361.
  - Pampas Grass, 65.
  - Preparations for Greenfeed Crops in South Island, 514.
  - Preparing Land for Autumn-sown Pasture, 536.
  - The Potato Tuber Moth, 517.
- Glasshouses, Heating, 471.
- Grafting and Cultivation, 71.
- Grainger, A. R.—
  - Case End Brander, 424.
  - Case-lining Bench, 431.
  - Cultivation and Grafting, 71.
  - Flax Stripper, 396.
  - Nail Stripper, 428.
  - Plant and Sprays for Orchard Diseases, 49.
- Grass around Beehives, Control of, 584.
- Greenfeed Crops in the South Island, Preparations for, 514.
- Grimmett, R. E. R.—Soil Fertility Research Station, 385.
- Growing Peas for Canning in Nelson Province, 145.
- Growing Peas for "Quick Freeze" and Canning, 233.
- Grow More Lucerne, 347.

H

- Harrowing of Pastures, Early Spring, 156.
- Harvesting of Cereal Crops, 561.
- Harvesting the Stone Fruit Crop, 571.
- Hay, Baled, Methods of Stacking, 533.
- Hay, Good-quality, Making, 453.
- Health Notes, 192.
- Heating Glasshouses, 471.
- Hedge Cutter, Boxthorn, Mechanical, 579.
- Heifers, Dairy, More Wanted, 20.
- Heifers, Dairy, Raising on Fat Lamb Farms, 19.
- Hill, R. P.—Studies in Farm Management: A Hawke's Bay Coastal Sheep Station, 27.
- Hitchcock, J. H.—Growing Peas for "Quick Freeze" and Canning, 233.
- Hives, the Value of Nucleus, in the Apiary, 327.
- Hoggets, Winter Feeding of, in Canterbury, 559.
- Holford, G. H.—
  - Fertilisers, 1.
  - Obituary, 392.
  - Serpentine Superphosphate, 289.
- Home, Colour in the, 373.
- Home, Furnishing the, 179.
- Home Garden Notes, 33, 167, 259, 315, 437, 529.
- Honey Surplus, Removing from Hives, 554.
- Hormones, Plant, 153, 199.
- Hormone Weedkillers, 67.
- How, C., and Whittleston, W. G.—A Survey of Machine Milking, 441.
- Hudson, J. P.—
  - Flower Garden Notes, 91, 95, 178, 287, 384, 481, 601.
  - Home Garden Notes, 259, 315.
  - Plant Hormones, 153, 199.
  - Propagation of Small Fruits, 509.
  - Selection of Sites for Growing Raspberries, 427.
  - Small Fruit Notes, 455, 509.
- Hume, J. E.—
  - Citrus Budwood Needs Careful Selection, 257.
  - Conserving Soil Moisture in the Orchard, 510.
  - Improved Citrus Types may come from "Sports," 344.
- Hydatids, Prevention of, 97.

I

- Improved Citrus Types may come from "Sports," 344.
- Infantile Paralysis, 192.
- Influence of Food Habits, 277.
- Ingenious Home-made Topdresser, 131.
- Intercultivation and Weeding, 446.
- Invalid, Meals for the, 282.

J

- Johnson, Dorothy—
  - Effect of Cooking on Food Values, 83.
  - The Influence of Food Habits, 277.
- Johnson, L. H.—
  - Methods Used in Removing Surplus Honey from Hives, 554.
  - Nectar Secretion in Clover, 111.

K

- Kennedy, J. D.—Avocado Culture in New Zealand, 129.

L

- Lambs and Ewes, Care of, during Lambing, 119.
- Lambs, Summer Fattening of in Canterbury, 409.
- Lea Land for Wheat, Preparation of, 464.
- Letter from America, 169.
- Lime, Bulk Distribution of, 39.
- Linseed Crop, the, 459.
- Linton, F. A.—Woody Tongue in Cattle, 25.
- Lucerne, 347.
- Lucerne Seed, 170.
- Lynch, P. B., and Cottier, K.—
  - Selective Weedkillers, 105.
- Lynch, P. B.—
  - Manuring of Wheat with Phosphates, 573.

M

- Machine Milking, a Survey of, 441.
- Machine Milking, Research into Problems of, 565.
- McIlwaine, J. E.—Much Damage to Carcasses of Pigs can be Avoided, 261.
- Maintaining Milk and Cream Standards, 393.
- Maize, 59.
- Maize, Seed, 149.
- Making Best of Pastures for Fodder Reserves, 425.
- Making Good-quality Hay, 453.
- Management of Growing Poultry Stock, 339.
- Manure, Farmyard, 151.
- Manuring Citrus Trees, 57.
- Manuring of Wheat with Phosphates, 573.
- Marmalade, 587.
- Marryatt, E. R.—Early Spring Harrowing of Pastures, 156.
- Mashes, Standard Poultry, 231, 356.
- Meachen, C.—First Aid in the Home, 265, 383, 485, 586.
- Meals, Attractive, without Meat, 174.
- Meals for the Invalid, 282.
- Meat, Attractive Meals without, 174.
- Mechanical Boxthorn Hedge Cutter, 579.
- Mercer, A. D.—
  - Preparation of Lea Land for Wheat, 464.
  - Studies in Farm Management: A Manukau Mixed Farm, 203.
- Merry, D. M. E.—Growing Peas for Canning in Nelson Province, 145.
- Methods of Stacking Baled Hay, 533.
- Metson, Norma K.—
  - Arrangement of Furniture, 487.
  - Backgrounds: Wall and Floor Coverings, 591.
  - Colour in the Home, 373.
  - Furnishing the Home, 179.
  - Modern Built-in Furniture, 271.
- Milk and Cream Standards, Maintaining, 393.
- Milking, Machine, a Survey of, 441.
- Milking, Machine, Research into Problems of, 565.

- Millet, Broom Corn, Danger in Grazing, 243.
- Modern Built-in Furniture, 271.
- Moir, G. M., and Peirson, H. M.—Curd for Feeding Pigs and Poultry, 417.
- Mole Drainage, 253.
- More Dairy Heifers Wanted, 20.
- Mother Culture and Bulk Starter Apparatus, 359.
- Moth, The Potato Tuber, 438, 517.
- Much Damage to Carcasses of Pigs can be Avoided, 261.
- Mulching in the Orchard, 329.
- Murray, J. R.—
  - Intercultivation and Weeding, 446.

N

- Nail Stripper, 428.
- Nectar Secretion in Clover, 111.
- New Zealand Poultry Flock Improvement Plan, 118, 405.
- North Island Pig Carcass Competition, 211.
- Novel Farm Water Supply, 7.
- Nucleus Hives, the Value of, in the Apiary, 327.

O

- Orchard, Conserving Soil Moisture in the, 510.
- Orchard Diseases, Plant and Sprays for, 49.
- Orchard Efficiency, Plan for, 227.
- Orchard, Soil Management in the, 329.

P

- Pampas Grass, 65.
- Parasitic Disease of Sheep, Gid: A Comparatively Rare, 397.
- Parkinson, N. M., and Elliott, I. L.—
  - Tree Felling and Splitting, 157.
- Paspalum, 511.
- Pasture, Autumn-sown, Preparing Land for, 536.
- Pastures, Early Spring Harrowing of, 156.
- Pastures, Making Best of, for Fodder Reserves, 425.
- Pastures on Second-growth Burns, Establishing of, 357.
- Pastures, Spring Sowing of, 53.
- Paterson, C. R.—
  - Control of Grass around Beehives, 584.
  - Selection of Sites for Apiaries, 249.
  - The Bee Smoker, 63.
  - The Value of Nucleus Hives in the Apiary, 327.
- Peas for Canning, Growing, in Nelson Province, 145.
- Peas, Growing, for "Quick Freeze" and Canning, 233.
- Pedigree Sow Records, 464.
- Peirson, H. M., and Moir, G. M.—Curd for Feeding Pigs and Poultry, 417.
- Peirson, H. M.—North Island Pig Carcass Competition, 211.
- Petch, H. J.—Appointment of, as Assistant Director of the Dairy Division, 247.
- Philpott, H. G.—Appointment of, as Supervisor of Herd Recording, 247.
- Phosphates, Manuring of Wheat with, 573.
- Pig Carcass Competition, North Island, 211.
- Pig Carcasses, Avoiding Damage to, 261.
- Pig Feed Crops, Winter, 338.
- Pig Recording, 9.
- Pigs and Poultry, Curd for Feeding, 417.
- Pigs, Cropping for, 73.
- Pigs, Rejection of, by Works, 497.
- Pip Fruit Trees, Reworking, 155.
- Plan for Efficiency in the Orchard, 227.
- Plant and Sprays for Orchard Diseases, 49.
- Plant Hormones, 153, 199.
- Plea for "Better Educated Cow," 433.
- Potato Tuber Moth, Combating, 438, 517.
- Poultry and Pigs, Curd for Feeding, 417.
- Poultry, Coccidiosis of, 515.
- Poultry Flock Improvement Plan, 118, 405.
- Poultry Mashes, Standard, 231, 356.
- Poultry Plant, Table, 121.
- Poultry Stock, Management of Growing, 339.
- Powell, A. A.—Heating Glasshouses, 471.
- Preparation of Lea Land for Wheat, 464.
- Preparations for Greenfeed Crops in South Island, 514.
- Preparing Land for Autumn-sown Pasture, 536.
- Preserved Fruit, Discolouring of, 177.
- Preserving Tomatoes for Winter Use, 366.
- Prevention of Hydatids, 97.
- Pritchard, D. K.—Home Garden Notes, 33, 167, 437, 529.
- Propagation of Small Fruits, 509.
- Protecting Young Fruit Trees from Rabbits, 426.
- Proud Flesh, Treating, 245.
- Pumice Land Farm, Developing a, 305.
- Pumpkins, Cattle, 245.
- Purvis, G.—
  - Farm Dairy Instruction, 303.
  - Maintaining Milk and Cream Standards, 393.

Q

- "Quick Freeze" and Canning, Growing Peas for, 233.

R

- Rabbits, Protecting Young Fruit Trees from, 426.
- Raising Dairy Heifers on Fat Lamb Farms, 19.
- Raspberries, Selection of Site for Growing, 427.
- Rationing, Fertiliser, 171.
- Rejection of Pigs by Works, 497.
- Removing Surplus Honey from Hives, 554.
- Renouf, L. R.—Protecting Young Fruit Trees from Rabbits, 426.
- Research into Problems of Machine Milking, 565.
- Reworking Pip Fruit Trees, 155.
- Richards, J. G.—Second Growth Control in South Otago, 549.
- Robinson, D. S.—Bottle Type Feeder for Feeding Bees, 120.
- Rodda, T. E.—
  - Care of Farm Implements, 113.
  - Retirement of, 248.
- Ross, W. D.—Rejection of Pigs by Works, 497.

S

- Sacks Must be Saved, 470.
- Scott, R. H., and Crosbie, C. J.—
  - Bulk Distribution of Lime, 39.
- Second-growth Burns, Establishing Pastures on, 357.
- Second Growth Control in South Otago, 549.
- Seed, Lucerne, 170.
- Seed Maize, 149.
- Selection of Site for Growing Raspberries, 427.
- Selection of Sites for Apiaries, 249.
- Selective Weedkillers, 105.
- Sellwood, T. A.—Sweet Clover, 567.
- Serpentine Superphosphate, 289.
- Shannon, A. T., and Topping, Eva—
  - Developing a Pumice Land Farm, 305.
- Shannon, A. T.—Raising Dairy Heifers on Fat Lamb Farms, 19.
- Sheep, Gid: A Comparatively Rare Parasitic Disease of, 397.
- Sheep with Staggers, 76.
- Silage, Wastage in, 566.
- Simple Home-made Toys for Christmas, 493.
- Simpson, J. E. V.—Danger in Grazing Broom Corn Millet, 243.
- Smallfield, P. W.—Farming in New Zealand: Subsistence Farming, 537.
- Small Fruit Notes, 455, 509.
- Smith, E. G.—The Linseed Crop, 459.
- Smoker, Bee, 63.
- Soil Fertility Research Station, 385.
- Soil Management in the Orchard, 329.
- Soil Moisture in the Orchard, Conserving, 510.
- Soil, Sterilisation of, 531.
- Sow Records, Pedigree, 464.
- Splitting and Felling, Tree, 157.
- Sprays and Plant for Orchard Diseases, 49.
- Spring Sowing of Pastures, 53.
- Spring Topdressing, 109.
- Stabilisation and the Farmer, 137.
- Stacking Baled Hay, Methods of, 533.
- Staggers, Sheep with, 76.
- Stainton, E. G.—Establishing Pastures on Second-growth Burns, 357.
- Standard Poultry Mashes, 231, 356.
- Starter Apparatus, Steam-operated Bulk and Mother Culture, 359.
- Steam-operated Bulk and Mother Culture Starter Apparatus, 359.
- Sterilisation of Soil, 531.
- Stone Fruit Crop, Harvesting the, 571.
- Studies in Farm Management—
  - A Hawke's Bay Coastal Sheep Station, 27.
  - A Manukau Mixed Farm, 203.
  - A Marlborough Mixed Farm, 319.
  - A Poverty Bay Hill-country Farm, 519.
  - A Taihape Sheep Farm, 399.
- Subterranean Clover, Direct Heading of, 582.
- Summer Fattening of Lambs and Winter Feeding of Ewes in Canterbury, 409.
- Superphosphate, Serpentine, 289.
- Survey of Machine Milking, 441.
- Swede and Turnip Crop, 215.
- Sweet Clover, 567.
- Swindells, K. A.—Methods of Stacking Bale Hay, 533.
- Sydenham, F.—Culture of the Feijoa, 465.
- Syme, P. S.—
  - A Novel Farm Water Supply, 7.
  - Ingenious Home-made Topdresser, 131.
  - Making Best of Pastures for Fodder Reserves, 45.
  - Paspalum, 511.
  - Wastage in Silage, 566.

T

- Table Poultry Plant, 121.
- Taylor, C. R.—
  - Grow More Lucerne, 347.
  - Spring Sowing of Pastures, 53.
  - Spring Topdressing, 109.
- Thinning of Fruit Crops, 424.
- Tobacco Farm, Establishing a, 37.
- Tomatoes, Preserving, for Winter Use, 366.
- Topdresser, Ingenious Home-made, 131.
- Topdressing from the Air, Bluestone, 193.
- Topdressing Results in Marlborough, 75.
- Topdressing, Spring, 109.
- Topping, Eva, and Shannon, A. T.—
  - Developing a Pumice Land Farm, 305.
- Topping, Eva—
  - Attractive Meals without Meat, 174.
  - Marmalade, 587.
  - Meals for the Invalid, 282.
  - Preserving Tomatoes for Winter Use, 366.
  - Simple Home-made Toys for Christmas, 493.
  - The New Flour, 177.
  - Useful Aprons from the Ragbag, 79.
  - Vegetable Cookery, 89.
- Toys for Christmas, Simple Home-made, 493.
- Treating Proud Flesh, 245.
- Tree Felling and Splitting, 157.
- Tuber Moth, Potato, Combating, 438, 517.
- Turnip and Swede Crop, 215.

U

- Useful Aprons from the Ragbag, 79.

V

- Vaccination Against Contagious Abortion, 457.
- Valentine, G. M., Retirement of, 32.
- Value of Nucleus Hives in the Apiary, the, 327.
- Vegetable Cookery, 89.

W

- Walker, C.—Cattle Pumpkins, 245.
- Wallace, J. O.—Turnip and Swede Crop, 215.
- Wall and Floor Coverings, 591.
- Walsh, F. P.—Stabilisation and the Farmer, 137.
- Walsh, R. S.—Beekeeping in North Auckland, 447.
- Ward, R. K.—Hormone Weedkillers, 67.
- Warts on a Bull, 396.
- Wastage in Silage, 566.
- Water Supply, a Novel Farm, 7.
- Weeding and Intercultivation, 446.
- Weedkillers, Hormone, 67.
- Weedkillers, Selective, 105.
- Wetas, Facts About, 436.
- Wheat, Manuring of with Phosphates, 573.
- Wheat, Preparation of Lea Land for, 464.
- Wheat Seed, Extension of Certification of, 507.
- Whitten, L. K.—Prevention of Hydatids, 97.
- Whittleston, W. G., and How, C.—
  - A Survey of Machine Milking, 441.
- Whittleston, W G.—Research into Problems of Machine Milking, 565.
- Wilkie, D. R.—
  - Direct Heading of Subterranean Clover, 582.
  - Studies in Farm Management: A Marlborough Mixed Farm, 319.
  - Topdressing Results in Marlborough, 75.
- Winter Feeding of Ewes and Summer Fattening of Lambs in Canterbury, 409.
- Winter Feeding of Hoggets in Canterbury, 559.
- Winter Pig Feed Crops, 338.
- Withell, E. C.—
  - Device for Lifting Clover Swaths, 408.
- Women's Section ("The Good Neighbour"), 77, 173, 267, 363, 472, 585.
- Wood, E. E. C., Retirement of, 248.
- Woody Tongue in Cattle, 25.
- Wool Fashions Display, 269.
- Wool Marketing, 170.
- Wool Secretariat in Paris, 243.

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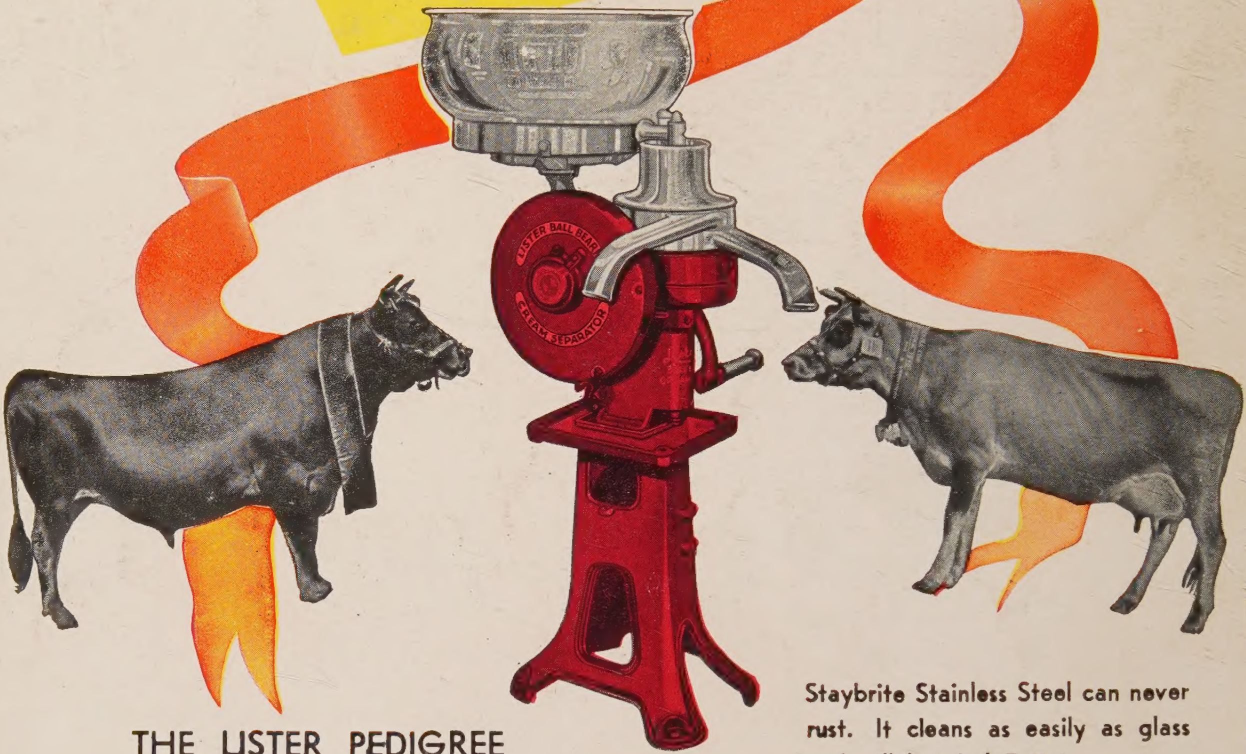

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